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Dear Detroit River RAP Stakeholder:

The Working Group on behalf of the International Four Agency Letter of Commitment Management Team is pleased to present the draft Detroit River Update Report for your comment. Your input is important to ensure the comprehensiveness of this Report. Please note that the main focus of data collection for this report is 1995 - 1999, although you may find more recent data in some areas of the report. Please review the draft and provide comments and/or additional data by March 15, 2002, to:

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DETROIT RIVER REMEDIAL ACTION PLAN UPDATE REPORT - 2001

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LIST OF ACRONYMS

AOC - Area of Concern
AHR - American Heritage River
BATEA - Best Available Technology Economically Achievable
BOD - Biochemical Oxygen Demand
BUI - Beneficial Use Impairment
CFS - Cubic Feet per Second
CSO - Combined Sewer Overflow
DDE - Breakdown product of DDT
DDT - Dichlorodiphenyltrichloroethane
DRCCC - Detroit River Canadian Cleanup Committee
DWSD - Detroit Water and Sewer Department
EC - Environment Canada
ERCA - Essex Region Conservation Authority
ERM - Effect Range Median
GLIER - Great Lakes Institute of Environmental Research
GLWQA - Great Lakes Water Quality Agreement
IJC - International Joint Commission
kg/d - Kilograms Per Day
LaMP - Lake Area Management Plan
MDEQ - Michigan Department of Environmental Quality
MDNR - Michigan Department of Natural Resources
MDPH - Michigan Department of Public Health
MISA - Ontario Municipal Industrial Strategy for Abatement
NAFTA - North American Free Trade Agreement
ng/l - Nanogram Per Liter
NOAA - National Oceanic and Atmospheric Administration
NPS - Non-Point Source
OMOE - Ontario Ministry of Environment
OMNR - Ontario Ministry of Natural Resources
PAH - Poly-aromatic Hydrocarbon
PCB - Poly-chlorinated Biphenyls
PCS - Pollution Control System
ppb - Parts Per Billion
ppm - Parts Per Million
PS/NPS - Point Source/Non-Point Source
RAP - Remedial Action Plan
SEL - Severe Effect Level
SEMCOG - Southeastern Michigan Council of Governments
SSO - Sanitary Sewer Overflow
TRI - Toxic Release Inventory
TWG - Technical Working Group
UGLCCS - Upper Great Lakes Connecting Channel Study
ug/l - Micrograms per Liter

USACE - United States Army Corps of Engineers
US EPA - United States Environmental Protection Agency
USF&WS - United States Fish and Wildlife Service
US GAO - United States Government Accounting Office
USGS - United States Geological Survey
WWPCP - West Windsor Pollution Control Plant
WWTP - Waste Water Treatment Plant

GLOSSARY

Acute Toxicity: Mortality that is produced within a short period of time, usually 24 to 96 hours.

Algae: Simple, rootless plants found in natural waters that grow in relative proportion to the amount of nutrients available. Sudden growth spurts, or blooms, can adversely affect water quality.

Area of Concern: A geographic area within the Great Lakes basin designated by the U.S. and Canadian governments where the environmental quality has been degraded, and the area's ability to support aquatic life has been diminished, or beneficial uses of the water have been impaired.

Beneficial Use Impairment: A change in the chemical, physical or biological integrity of the Great Lakes System sufficient to cause any of the fourteen conditions listed in Annex 2 of the Great Lakes Water Quality Agreement of 1978.

Benthic: Occurring at the bottom of a body of water.

Benthos: Bottom dwelling organisms.

Bioaccumulation: The accumulation and concentration of certain persistent chemicals in a food chain. By means of this process, extremely small quantities of certain persistent chemicals in water are known to concentrate along a food chain. Concentrations of these chemicals are magnified at the top of the food chain (e.g., fish in an aquatic ecosystem).

Biochemical Oxygen Demand (BOD): The decrease in oxygen content in milligrams per liter of a sample of water kept in the dark at a certain temperature over a specified period of time. This consumption of oxygen is brought about by the bacterial breakdown of organic matter. As a rule, BOD is measured after five days (BOD₅), at which time 68% of the final value has usually been reached.

Chlorides: A form of chlorine that is produced when salt is dissolved in water. Chlorides in high concentrations produce a brackish taste in water.

Clean Water Act: The common name for the U.S. Federal Water Pollution Control Act of 1977. Enacted to "restore and maintain the chemical, physical, and biological integrity of the nations waters."

Combined Sewer Overflow: A discharge of a mixture of raw sewage and surface runoff directly to a body of water. In dry weather, combined sewers carry only sanitary sewage to a treatment plant. However, during wet weather these sewers carry storm

water as well. If the flow is excessive, the sewage/storm water combination overflows directly into the receiving waters.

Concentration: Expression of the weight of a substance per unit volume of water, sediment or body material (example—milligrams per liter).

Connecting Channels: A stream or river connecting two larger bodies of water. The connecting channels of the Great Lakes include the St. Mary's, St. Clair, Detroit, Niagara and St. Lawrence rivers, and Lake St. Clair.

DDT (dichlorodiphenyltrichloroethane): A highly toxic, chlorinated hydrocarbon insecticide. DDT is now banned from use, but residual amounts remain in the aquatic environment from its long history of use and environmental persistence.

Dieldrin: A highly toxic persistent insecticide.

Effluent: As used in this report, effluent refers to the wastewater discharged from point sources into the aquatic environment.

Fecal Coliform: Species of bacteria that are present in the digestive tracts of humans and other warm-blooded animals. These are not disease producers, but great numbers of these bacteria indicate unsanitary conditions where disease-causing organisms may also be present.

Loading: A unit describing the total mass of a substance carried at a given point in a river during a unit time (example-kilograms per day).

Macroinvertebrates: Invertebrate animals large enough to be seen by the unaided eye, which live at least part of their life cycles within or upon available substrates in a body of water or water transport system.

Mayfly: Insects with fragile bodies and slender tails that can be quite abundant in ponds and streams. The immature form of this insect can be found in nearly all types of unpolluted aquatic habitats. Mayflies are among those organisms that water pollution biologists refer to as clean-water-associated.

Milligrams per liter (mg/l): The most common unit of concentration used in water quality, equal to one milligram of a substance in a liter of water. If sixty pounds of salt were dissolved in a block of water one hundred feet wide, one hundred feet long and one hundred feet deep the concentration would be approximately 1 mg/l.

Nonpoint Source: Discharge that does not enter the watercourse at a fixed point, such as surface runoff from precipitation or atmospheric deposition.

NPDES (National Pollution Discharge Elimination System) Permits: Permits issued by the Michigan Department of Environmental Quality, which authorize the discharge of wastewater. They stipulate the quality of the discharge and set time limits for compliance.

Nutrients: Any of a group of elements necessary for growth. Although over fifteen elements have been identified as necessary for the growth of aquatic plants, phosphorus is usually the limiting nutrient in Michigan surface waters.

Parameter: A measurable quantity whose value varies with place and time.

Point Source: A discharge of wastewater from a fixed point such as a municipal or industrial plant effluent pipe.

Pollution-tolerant: Able to withstand polluted conditions.

PCBs (Polychlorinated Biphenyls): A class of toxic organic compounds containing one or more atoms of chlorine. These are resistant to high temperatures and do not break down in the environment. They are also widely distributed in the environment and food chains.

Sediment Hot Spot: For the purpose of this report a site, which has been identified as having sediment toxicity results of greater than eighty per cent toxicity for one or more test species, and/or; a site with sediments containing elevated levels (above the severe effect level) of any parameter identified by the fish consumption advisories (mercury and PCBs), and/or; a site where sediment chemistry parameters other than mercury and PCBs are in excess of the severe effect level.

Species Diversity: An ecological measurement, which combines the number of species present in a community (species richness) with the relative abundance of the species.

Toxic Material: A substance or compound that is poisonous.

Water Quality Standard: A level of water quality that must be met to ensure that a stream or lake can be used for its designated uses (i.e., swimming, fishing, water supply).

Watershed: Land areas that drain into a common lake

EXECUTIVE SUMMARY

This report is intended to serve as the Detroit River Biannual Report to the IJC as per the GLWQA of 1978, Annex 2, section 7 (a). This report updates data and activities conducted, proposed, or underway, since the 1996 Detroit River RAP Report, and continues long-term trend information where possible. The purpose of this document is to report on the status of the Beneficial Use Impairments (BUIs) of the Detroit River and the status of efforts being undertaken to address those BUIs.

In an effort to evaluate the condition of the Detroit River relative to our collective overall goal for a "drinkable, swimmable, and fishable" River, trends on the status of the BUIs are described here as a means to summarize and represent all the information contained in this report. The status of Restrictions on Fish and Wildlife has remained unchanged since 1996 because fish consumption advisories still exist and there have been no assessments conducted, or limits established, for consumption of wildlife. There has been improvement on Restrictions on Drinking Water Consumption, or taste and odor problems. Most taste and odor complaints that the water treatment facilities have received recently have not been due to contaminants, but seasonal algal blooms. Based on the current criteria, the status of Beach Closings has remained unchanged. The number of exceedances of the bacteria standards has remained stable from 1995 to 1999 at Belle Isle beach. The number of days of *E. coli* exceedances at Sandpoint beach and Holiday beach have also not varied significantly between 1996 and 2000. Exceedance of water quality standards or objectives have been improving. Although there continues to be exceedances, concentration trends of major contaminants are decreasing or have remained unchanged since 1996. There continues to be Restrictions on Dredging, therefore, this impairment remains unchanged. Tainting of Fish and Wildlife Flavor remains unknown. No major studies have been conducted to indicate a change of this impairment since the 1996 Rap Report designated this category impaired for fish flavor. The status in change of Degradation of Fish and Wildlife Populations remains unknown; there is little data since 1996 to evaluate positive or negative trends. The status in trends of Fish Tumors or Other Deformities is also unknown due to lack of data. Although there has been a great deal of success in protection and restoration of Fish and Wildlife Habitat, development pressure and contamination continues to result in a downward trend of the impairment. Some long-term studies are showing an improvement in bird and animal deformities or reproductive populations, most notably the Herring Gull and Eagle monitoring programs.

The future outlook for the Detroit River is positive. In recent years, the River and Riverfront have been the focus of much public attention and optimism. The Detroit River is the first river in North America to be designated an International Heritage River, and there has been tremendous progress on both U.S. and Canadian shorelines to make the River more publically accessible. Historical trends indicate that effects to

Impairments of Beneficial Use have decreased significantly. Generally, throughout the 1990s, there has been a continued gradual decrease or leveling off of additional harm to the River. However, in compiling this report, two main challenges for the near future are evident: the need for a strategic monitoring plan for the entire river based on delisting of Impairments to Beneficial Uses; and continued emphasis on the protection and restoration of habitat and wetlands.

Table 1
Status of Beneficial Use Impairments in the Detroit River
Area of Concern (AOC), Listed by Category

GLWQA Use Impairment	Status	Trend Since 1996
WATER		
Restriction on fish and wildlife consumption	Impaired (for fish)	← →
Restrictions on drinking water consumption, or taste and odor problems	Impaired (taste and odor problems)	↑
Beach Closings	Impaired	← →
Degradation of aesthetics	Impaired	?
Exceedance of water quality standards or objectives	Impaired	↑
Eutrophication or undesirable algae	Not Impaired	N/A
Degradation of phytoplankton and zooplankton populations	Not Impaired	N/A
Added costs to agriculture or industry	Not impaired	N/A
SEDIMENT AND BENTHOS		
Degradation of Benthos	Impaired	← →
Restriction on dredging activities	Impaired	← →
HABITAT AND WILDLIFE		
Tainting of fish and wildlife flavor	Impaired (fish flavor)	?
Degradation of fish and wildlife populations	*Not impaired (fish), (unknown for wildlife)	?
Fish tumors or other deformities	Impaired	?
Loss of fish and wildlife habitat	Impaired	↓
Bird or animal deformities or reproductive population	*Unknown	?

Data from 1996 RAP Report.

* In 1999, DRCCC considered these BUI's as impaired in the Detroit River Update Report. Formal redesignation of these impaired uses has not been considered under the 4 Agency Agreement.

Key: ↑ status improving; ↓ status worsening; ← → status unchanged; ? not enough information to make a determination of status at the present time; N/A status was previously designated as not impaired.

CHAPTER 2

Background Information

2.1 Purpose/Introduction

This report is an update on the progress of the Detroit River Remedial Action Plan (RAP) process since the Detroit River RAP Update in 1996. It is not intended to replace longer, technical documents that may be issued separately. The report focuses on the status of the RAP implementation activities, updates technical information, and highlights trends in the status of BUIs. This report is intended to meet the reporting requirement in the Great Lakes Water Quality Agreement (GLWQA) and Four Agency Letter of Commitment. For a more detailed background on the history of the Detroit River RAP, refer to previous binational governmental documents such as the Upper Great Lakes Connecting Channel Study (UGLCCS), 1988; Stage 1 the Detroit River Remedial Action Plan, 1991; or the Detroit River Remedial Action Plan Report, 1996. For additional background, please refer to the references cited in the Bibliography.

2.2 Background

The GLWQA was signed in 1978 and amended in 1987 by the governments of the United States and Canada. It required the Federal governments of Canada and the United States, in conjunction with the State and Provincial governments, to identify Areas of Concern (AOC) in the Great Lakes and to develop, in consultation with the public, RAPs to guide the cleanup and restoration of these areas. In 1987, the United States and Canadian governments, under the terms of the GLWQA, have designed forty-two AOCs in the Great Lakes basin. An AOC is defined as "geographic areas that fail to meet the general or specific objectives of the GLWQA where such failure has caused or is likely to cause impairment of beneficial use of the area's ability to support aquatic life," (GLWQA, 1978). The Detroit River (Figure 1) is one of the forty-two AOCs. The GLWQA also details the development and implementation of RAPs. RAPs are clean up plans to improve environmental quality and restore beneficial uses. Since the original designation, one AOC has been delisted in Canada (Collingwood Harbor, Ontario) and one new AOC (Presque Isle, Pennsylvania) has been identified in the United States. Fourteen potential impairments to beneficial uses were defined in the GLWQA. The beneficial uses identify the ways in which humans and wildlife use the water body that may be significantly impacted by changes in its chemical, physical, or biological integrity. The Detroit River stakeholders defined a fifteenth potential impairment of beneficial uses shortly after completion of the Stage 1 RAP. Table 2 lists all fifteen potential impairments, water quality goals, the current status of each, as well as a short summary of progress towards meeting the water use goals.

Figure 1
Map of Detroit River Basin

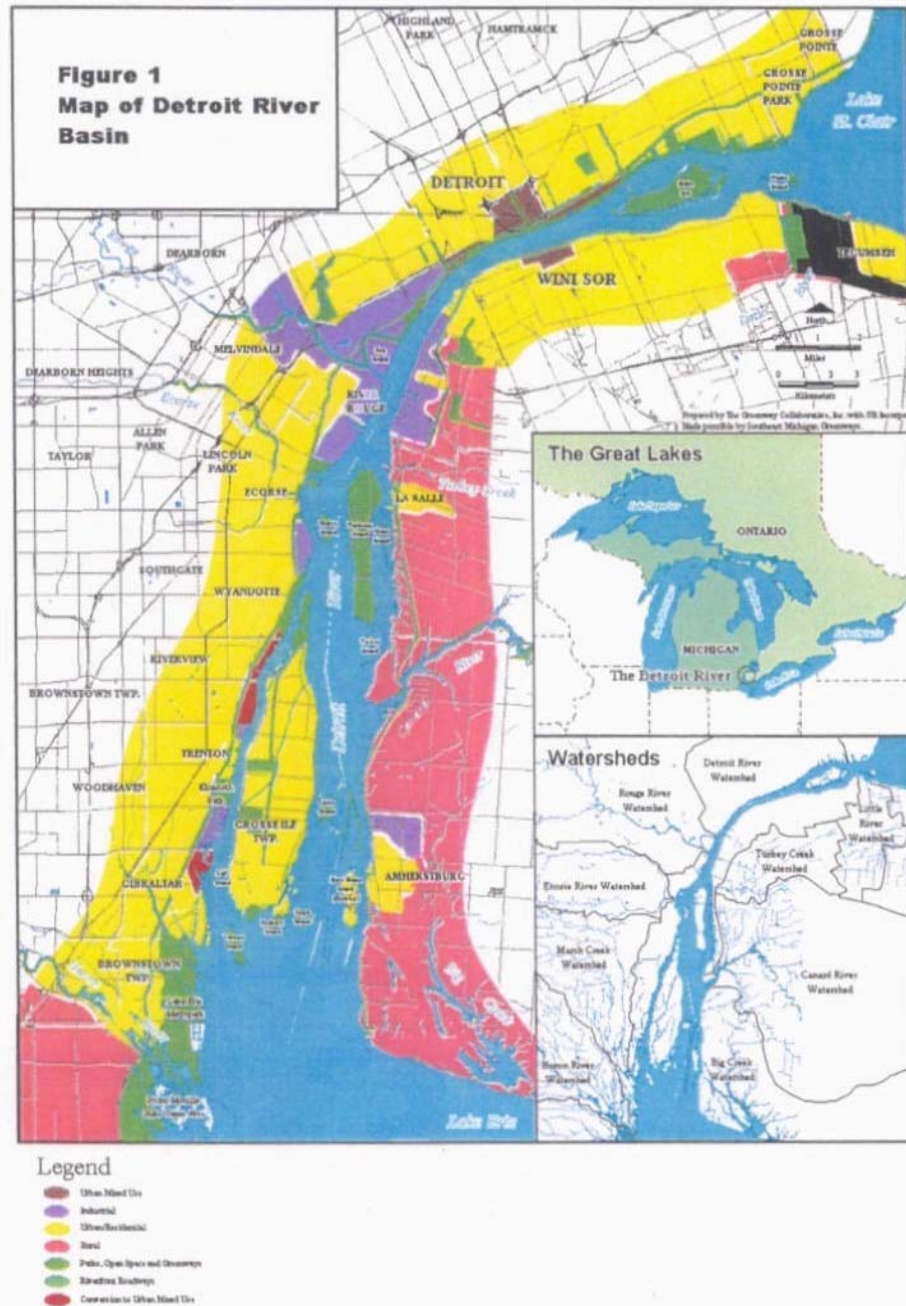


Table 2
Summary of Progress Regarding Impaired Beneficial
Uses in the Detroit River AOC

Use Impairment	Specific Water Use Goal	Status from 1996 Report	Current Progress/Status
WATER			
Restriction on fish and wildlife consumption	Levels of contaminants in fish tissues shall be less than MDPH and OMNR, MOE action levels	There were consumption advisory for walleye, carp, rock bass, freshwater drum	There continues to be fish consumption advisories for carp, freshwater drum, redbreast sucker, walleye, and yellow perch. There are no wildlife consumption advisories. Due to the continuation of fish consumption advisories, and lack of information on wildlife populations, the status of the BUI remains unchanged from 1996
Restrictions on drinking water consumption or taste and odor problems	There shall be no taste or odor problems	No restrictions on drinking water have occurred, however taste and odor problems were reported in 1990	No restrictions on drinking water have occurred, taste and odor problems have not been identified, because there have been no significant taste and odor episodes for 10 years, therefore, the status of this impairment is considered improving
Beach Closings	All AOC areas shall be safe for total body contact activities. Bacteria levels shall meet OMOE/MDEQ criteria. There shall be no beach closings in the AOC or impacted areas in Lake Erie due to AOC contamination	Total body contact activities in areas of the river are periodically impaired due to elevated bacteria levels. Beach closings have occurred in the Ontario AOC. The only beach in Michigan AOC is on Belle Isle and it has not been closed due to bacteria concerns	The number of bacteria exceedances at Belle Isle beach have remain relatively unchanged from 1995 -1999. The number of bacteria exceedances at Sandpoint beach and Holiday beach also have not varied significantly since 1996 . Extensive planning has been completed and work has begun to eliminate/treat CSO through construction of retention basins and sewage treatment plants upgrade in AOC. A positive change for this BUI is expected in the future, however, currently the status of beach closings is considered unchanged.

Use Impairment	Specific Water Use Goal	Status from 1996 Report	Current Progress/Status
Degradation of aesthetics	Elimination of the discharges from CSOs and spills from point sources and non-point sources such that debris and persistent objectionable deposits are not found in the River or along the shoreline. There shall be no visible oil sheens on the river from any discharge	Debris and persistent objectionable deposits from CSO's exist along areas of shoreline. In addition, numerous spills of various materials have been noted to occur in the river. Industrial development and urbanization have detracted from the natural beauty of the area, although these are not water quality impacts	Objectionable deposits continue to persist, however, CSO controls are currently being implemented and these occurrences should be reduced significantly in the coming years. The number of reported spills since 1996 are about the same for each year, although one major discharger in the US has reduced their reported spills by 80%. Since the condition of aesthetics is subjective the status is considered questionable without further public consultation.
Exceedance of water quality standards or objectives	Ambient water quality will not exceed current water quality standards or objectives, total PCBs 0.00002 ug/l; mercury 0.0006 ug/l; zinc 30 ug/l; copper 5 ug/l; cadmium 0.2 ug/l; lead 2.88 ug/l.	Water quality standards had been exceeded for copper, zinc, cadmium, and lead. Actual mercury values are unknown due to method detection levels above the water use goal. There is no data for PCB's.	Detection limits for mercury have improved, mercury and cadmium levels have been detected in exceedance of water quality standards. There is no available data for PCB's for this report. Although exceedances continue, the concentration of contaminants in water appears to be declining over time, therefore, the status of this BUI is considered improving.
SEDIMENT & BENTHOS			
Degradation of Benthos	Establish and maintain benthic communities such that populations are diverse and appropriate for the physical characteristic of the area and include pollution tolerant organisms	Degraded benthic communities have been noted: Michigan: Shoreline from Rouge River to mouth	Canada and the US have both conducted major studies on sediments in the river. There are 6 major areas identified for sediment remediation. A sediment removal was completed on Monguagon Creek and two more are slated to begin once disposal of sediments can be arranged. The status of this BUI is considered unchanged because sediment removal has not yet been undertaken at the 6 areas designated in the 1996 Update Report.

Use Impairment	Specific Water Use Goal	Status from 1996 Report	Current Progress/Status
Restrictions on Dredging	Concentration of pollutants in sediments shall be below levels that restrict dredging.	Michigan: dredge spoils from shoreline downstream of Conners Creek are not suitable for open water disposal based on levels of metals and , in some areas, PCBs in sediments. Midriver: dredge spoils from the lower river not suitable for open water disposal based on levels of cyanide, copper, lead and zinc. Ontario: Concentration of arsenic, chromium, copper, iron, lead, zinc, cyanide, mercury, and PCB sediment concentrations in some areas exceed OME guidelines.	Contamination in sediment areas previously identified continue to restrict dredging, therefore, the status of this BUI is considered unchanged.
HABITAT & WILDLIFE			
Tainting of fish and wildlife flavor	No tainting	Fish flavor impairment studies on the Detroit River carried out by the MDNR and MDPH indicate the possibility of a low incidence of flavor impaired walleye in the Trenton Channel area of the Detroit River.	A 1996-1997 Health Canada Study surveyed 999 anglers using the Detroit River. Of the 520 anglers who consumed fish 75% consumed Detroit River fish because it "tasted good." The status of this BUI is subjective and more information is needed from anglers on both sides of the River to determine the direction in status.
Degradation of fish and wildlife populations	To maintain a healthy, diverse and self-sustaining fish and wildlife community	The fish community is now structured more toward benthivores than it was originally, however, over 60 species have been found in the river, with fish occupying all niches. Wildlife population in the AOC have decreased due to urbanization. Some loss of reproductive capacity has occurred (bald eagles), however, this appears to be a problem associated with conditions in the Great Lakes Basin rather than specific to the Detroit River	PCB levels in herring gulls are declining, the only study on ducks concluded that the AOC and Lake Erie are a major source of contamination to migrating ducks, a single study on bald eagles concluded that organic contaminants in blood have remained stable from 1990 -1999 and populations are increasing. Contaminated sediments are major sources of PCB contamination and PAH exposure to bottom-dwelling fish. However, the identification of sentinel species and more information is needed to determine the direction in status.

Use Impairment	Specific Water Use Goal	Status from 1996 Report	Current Progress/Status
Fish tumors or other deformities	Liver and oral or dermal tumor incidence rates shall be no greater than rates at unimpacted control sites. Survey data shall confirm the absence of neoplastic or preneoplastic liver tumors	Liver tumors at levels exceeding background incidence rates have been found in five species	There have been no further studies of fish tumors or other deformities since 1996, so there is a lack of information on the current status of fish tumors. Therefore, more information is needed to determine the direction in status of this BUI.
Loss of fish and wildlife habitat	Wetlands shall be maintained at zero loss in the AOC, and no net loss of the productive capacity of fish habitats. Remediation, amelioration and restoration of wetlands shall be conducted whenever feasible. Management plans for fish and wildlife should be developed, and subsequently evaluated to determine if the current level of habitat supports the management plans' goals. Additional evaluation is necessary to determine the effects of water and sediment quality on biota	This use is impaired as a result of significant loss of wetlands and habitat which has occurred due to industrial development and urbanization. It is recognized that existing wetlands in the AOC should be protected. Draft fish community goals also emphasize the achievement of no net loss of the productive capacity of fish habitats and the restoration of habitats wherever possible. Fish and wildlife management goals are needed to help further determine the extent of impairment and guide future rehabilitation strategies. Impairment due to water quality concerns had not been adequately documented. This area of study needs further evaluation.	524 hectare have been protected or restored since 1990. There are efforts underway to map, characterize, and protect remaining wetland. There is no tracking of overall net loss of wetland, loss is recorded on an individual site basis. There has been no progress on assessing impairment due to water quality. Urbanization continues to grow along the river, threatening areas like Humbug Marsh the largest US wetland left in the river. As development continues to threaten areas along the River, the status of this BUI is considered worse than in 1996.
Bird or animal deformities or reproductive problems	Deformities and reproductive problems shall be no greater than rates at unimpacted control sites	The Stage One listed the status of this impairment as "not impaired." Eagles on the Canadian shoreline have experienced reproductive failures in some years. The cause of these failures has not been determined. Therefore, the status has been changed to "unknown."	PCBs and DDE in eagle eggs have declined significantly between 1974 -1994, concentrations of PCB, DDT and DDE in eaglet blood have remained stable between 1990-1996. Contaminants still are playing a role in limiting eagle numbers. Other indicator species remain to be identified and studied, therefore, more information is needed to determine the direction in status of this BUI.

2.3 Responsibility for the Remedial Action Plan

Under a 1998 Letter of Commitment, Environmental Canada (EC), the Ontario Ministry of Environment (OMOE), the United States Environmental Protection Agency (U.S. EPA), and the Michigan Department of Environmental Quality (MDEQ), which are collectively called the Four Agencies, agreed that the U.S. EPA, and MDEQ will "have primary responsibility for the administration of the shared activities for the Detroit (River) RAP." This means that U.S. EPA and MDEQ have shared accountability to promote RAP implementation and work with other implementers to undertake remedial work that is within their jurisdiction.

Implementation activities are coordinated locally through the Detroit River Canadian Cleanup Committee (DRCCC), and the Detroit River Steering Committee in U.S. (See Chapter 8). Other agencies, municipalities, businesses, and citizens also have key roles in restoring our shoreline and watershed. Many agencies have programs that include efforts that benefit the RAP. For example, the U.S. Army Corps of Engineers (USACE) and MDEQ regulate wetlands and dredging. Municipalities are responsible for many aspects directly related to RAP goals, like land use planning, environmental health, storm water management, wastewater collection and treatment. Businesses and municipalities are major property owners along the River, large consumers of water, discharge wastewater to the River. These entities can make a substantial contribution to RAP goals. Citizens are also responsible for the RAP and can contribute by getting involved in Detroit River RAP implementation teams, volunteering with other groups that support River revitalization efforts, attending and commenting at public meetings, and through individual actions at work, home, and school.

2.4 Why is the Detroit River an Area of Concern?

The Detroit River watershed suffers from contaminated sediments, combined and sanitary sewer overflows (CSO, SSO), loss of habitat, contamination in fish, contaminated runoff, industrial discharges, and non-point source pollution. The Detroit River is the single largest source of contaminants to Lake Erie.

2.5 Progress of Impaired Uses

Due to the complex nature of scientific and social problems plaguing the Detroit River progress has been slow. Although the River has been the subject of much scientific research, criteria specific enough to describe the requirements to achieve delisting of beneficial use impairments for the River has yet to be developed. Currently, a binational group is working together to develop and incorporate delisting criteria for the Detroit River. These criteria will provide the means to describe what the goal of delisting a particular impaired beneficial use means. Once delisting criteria are reviewed publicly and adopted, they will become the measurable endpoint for which implementation activities will be undertaken. This work is intended to provide a long

term integrated strategy to delist beneficial use impairments and is not to preclude efforts previously identified as necessary steps toward environmental protection/restoration of the River.

Table 2 provides a general summary of progress in respect to water use goals outlined in the 1996 Detroit River RAP Report (under a separate cover to this report, Attachment 1). The beneficial use designations are unchanged since 1996. However, Appendix A outlines major efforts towards addressing restoration recommendations since 1996.

2.6 Is the River Fishable, Swimmable, and Drinkable?

The general goals of the Detroit River RAP are to make the river a fishable, swimmable, drinkable water body.

The Detroit River provides a world class fishery, however, there continues to be fish consumption advisories for carp, freshwater drum, redhorse sucker, walleye, and yellow perch (MDPH, 1999). Mercury and PCBs are the current contaminants limiting consumption of fish in the Detroit River (MOE, 1987 - 2000, DRCCC, 1999). The State of Michigan and the Province of Ontario issue periodic fish advisories based on risk assessments resulting from fish tissue surveys. U.S. fish advisories can be found on the World Wide Web at <http://www.mdch.state.mi.us/pha/fish/> and Canadian advisories can be found at <http://www.ene.gov.on.ca/envision/guide/index.htm>.

The removal of contaminated sediments may ultimately influence future fish consumption advisories. However, due to the ubiquitous nature of PCB's and mercury, as well as the migratory nature of fish, fish consumption advisories may continue after all sources are eliminated from the AOC.

The managed swimming beaches along the Detroit River are Belle Isle on the U.S. side and Sandpoint Beach and Holiday beach on the Canadian side. Sandpoint Beach has been sampled approximately seventy times since 1996 for *E.coli*. Counts exceeding the 100 colonies/100 ml standard have occurred eighteen times since 1996 resulting in a 26% exceedance rate from the samples taken. However, Sandpoint beach is at the very head of the River in Lake St. Clair and is affected by sources outside the AOC. Holiday beach at the mouth of the Detroit River in Lake Erie has also been sampled seventy times since 1996, *E.coli* counts exceeded the 100 colonies/100 ml standard thirteen times, (Marsden, 2001) or 19% exceedance rate from the samples taken. The beach on Belle Isle is sampled twice a month from April through October. The standards of 200 colonies/100 ml for fecal coliform and 130 colonies/100 ml for *E.coli* were exceeded thirty-four times between 1995 and 1999, (Detroit Health Department, 2000) resulting in a 49% exceedance rate. However, the number of exceedance per year has remained stable. There are a number of "non-managed" beaches in the lower River where many people swim, such as Crystal Bay and Bois Blanc Island, which are

not sampled nor are there plans to undertake sampling of non-public beaches. Major efforts to correct combined sewer overflows (CSO) to the Detroit River and Lake St. Clair have been on-going since 1994 and will continue through 2020's. CSO control is a major step in reducing the amount of bacterial matter entering the Detroit River, and impact to the River is expected to improve with each additional construction project. (See Appendix B for additional information on RAP activities in this area.)

There have been no restrictions on treated drinking water for taste and odor problems since 1990. Local municipalities who draw water directly from the Detroit River for domestic consumption have indicated that there have been no complaints regarding the treated drinking waters' taste or odor resulting from contaminants in the water (Health Unit, 2001 and DWSD, 2001). There have been no significant violations of drinking water standards from U.S. water treatment facilities (SDWIS, 2001). The Windsor water treatment supply system is reported in 1998 and 1999 to have "good quality water" maintained throughout the distribution system (Windsor, 2001).

CHAPTER 3

Water

3.1 Current Ambient Water Quality

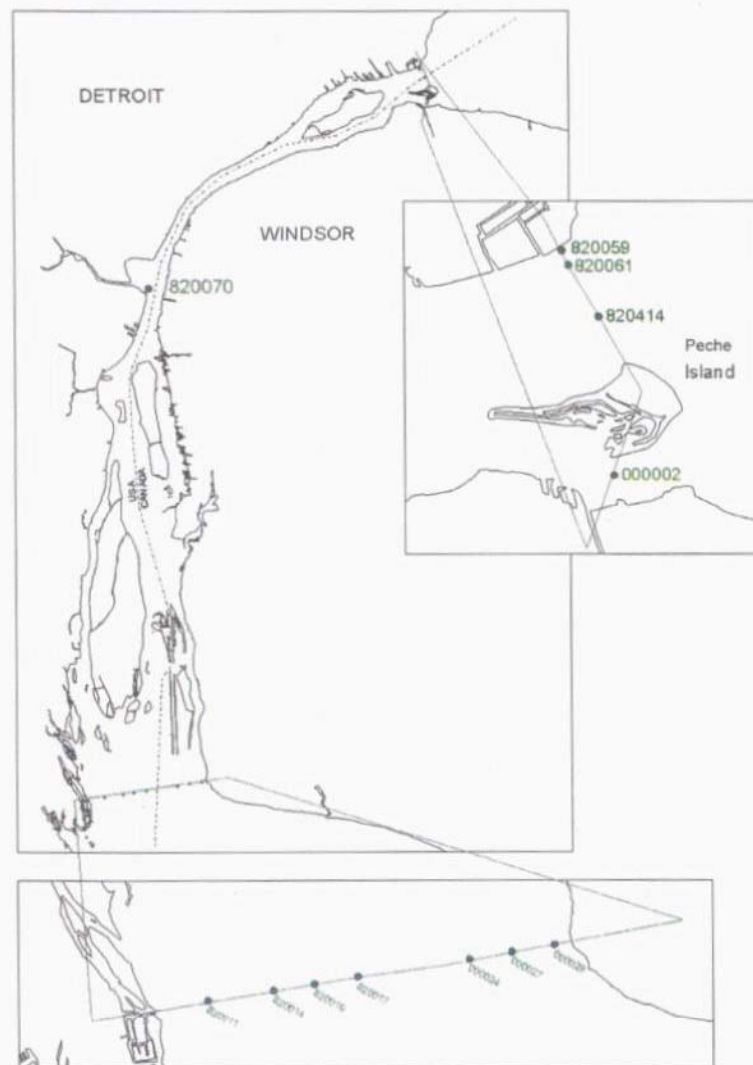
3.1.1 Upstream Inputs and Ambient Water Quality. Established ambient water quality monitoring stations have been sampled for low level metals by MDEQ since 1996, and for many other parameters since 1969. These stations span the River at the head near Peach Island and at the mouth of the River south of Grosse Ile (Figure 2). The data are the results of ambient water samples taken at each location. (Also see Appendix E, Detroit River Ambient Water Quality 1992 to 1998 for head and mouth data).

3.1.2 Mercury. The level of monitoring data currently available does not allow for an overall assessment of ambient water quality trends, because of limited number and locations of samples collected and method detection levels too high for interpretation. For example, most mercury values are estimated to be below 0.2 ug/l (0.2K); however, the Michigan Human Non-cancer Value for Protection of Human Health is 0.002 ug/l. From samples taken between 1992 and 1997 it is not possible to determine by this estimate if the reported value is below the health criteria. In 1998, samples were collected at mid-channel stations 820414 and 820017, and some detections for mercury were quantified. These samples were analyzed using a lower method detection limit than had been used previously (MDEQ, 2000). The mean result at station 820414 (River head) for samples where mercury was detected was 0.161 ug/l and at station 820017 (River mouth) the mean result for mercury was 0.160 ug/l.

There have been several contaminant studies of the Detroit River and some conclusions can be made. Mercury concentrations were measured in the Trenton Channel (Rossman, 1995). Sampling occurred at transects at the head of the channel in Wyandotte and at the mouth of the channel in Trenton. The minimum result of the fifty collected samples was a mercury concentration of 0.0012 ug/l, the maximum was 0.019 ug/l with a mean of 0.005 ug/l \pm 0.0043 ug/l. A variation in the total mercury concentration from the upper to the lower transect was noted. In the upper transect the highest reading was 0.0031 ug/l along the western shore and 0.0010 ug/l along the eastern shore. The lower transect readings increased substantially from 0.015 ug/l on the west shore to 0.0034 ug/l on the eastern shore.

3.1.3 PCBs. In 1997, Foese conducted a study of PCBs in the Trenton Channel. He attributed the current PCB input to the Detroit River to be mainly from contaminated sediments, localized point sources and atmospheric deposition. The total PCB transport through the Trenton Channel in 1995 was approximately 600 kilograms (Foese, 1997). This is a slight decrease from the 1986 data presented in UGLCCS

Detroit River Water Monitoring Locations for Head and Mouth Transects Map



Source:
River Action Plan report, 1996

Detroit

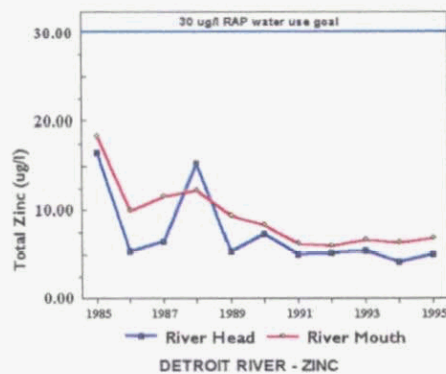
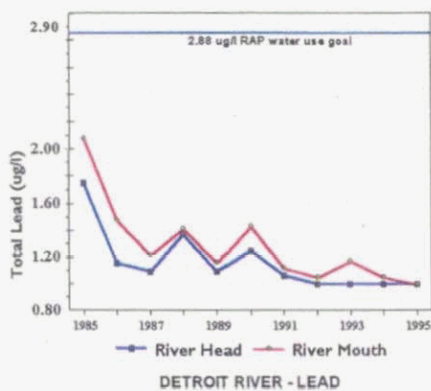
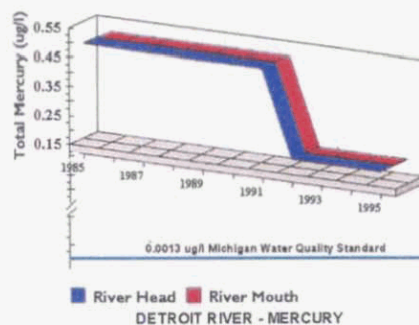
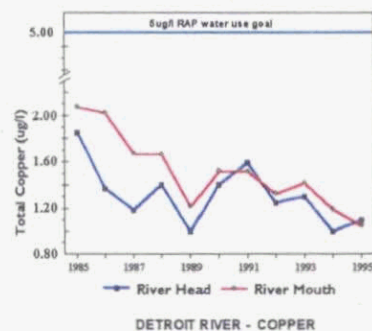
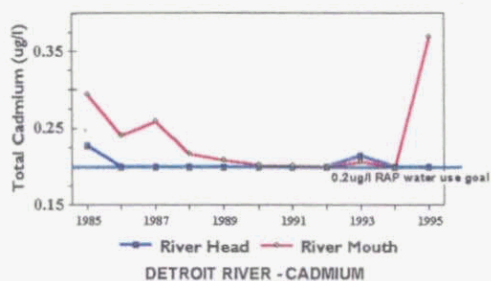
when PCB loads were estimated to be in the range of 659 to 752 kilograms per year. PCB concentrations in the Trenton Channel increase after a significant rainfall and decrease to ambient levels after ninety-six hours. The increase was most likely due to a combination of surface run-off from Urban areas, and resuspension of sediments upstream of the Trenton Channel. Stringent PCB regulation in the past twenty years has decreased PCB inputs to the river twenty fold (Froese, 1997). The general conclusion from UGLCCS was that PCB levels, unlike mercury, are relatively consistent throughout the Huron-Erie river corridor.

3.1.4 Other Metal Data. Figure 3 shows metals data trends from MDEQs' routine head and mouth survey of ambient water. It appears that the level of cadmium in the Detroit River has leveled off in the 1990s and input from the Detroit system to Lake Erie has declined. However, cadmium levels in the ambient water appear to be very close to the 1996 water quality goal of 0.2 ug/l and may actually exceed this goal. Ambient levels of copper in water appear to be declining recently. It is not possible to determine from the available data to what extent, if any, the Detroit system is contributing to the amount of copper in the ambient water. Copper levels are below the water use goal of 5 ug/l. Mercury levels have remained relatively unchanged throughout the 1990s. The amount of mercury input from the Detroit system to Lake Erie remains questionable due to the high number of non-detect values (Appendix C), however ambient water levels of mercury appear to be well above the new Michigan Water Quality Standard of 0.0013 ug/l. There are no discernable trends for lead in the 1990s. Lead levels appear to be approaching the same concentrations at the mouth as they are at the head, indicating the input of lead to the Detroit system may be leveling off. Concentrations of lead are below the 1996 water use goal of 2.88 ug/l. Finally, there does not seem to be a clear trend in zinc levels in the River in the 1990s. Zinc is slightly higher at the River mouth than at the head indicating an input of zinc from the Detroit River system into Lake Erie. Zinc levels seem to be well below the 1996 water use goal of 30 ug/l.

3.2 Trends

If studies on the Trenton Channel are indicative of the entire River, then the levels of PCB in water have been declining in the 1990s. Here are only minorly discernable trends in the water quality data within the main River channel. The low number of sampling locations and few pollutants that have been sampled from 1995 to 1997 (See Appendix C) do not allow for statistical analysis of trends.

Figure 3
Ambient Water Trends for Selected Metals, 1985 -1995



Ac
co

rding to MDEQ 303d listings, the entire Detroit River remains in a water quality non-attainment status for the presence of pathogens, untreated sewage discharge (from CSOs), mercury, and PCBs.

Water Quality Summary of Progress/Status

- In 1998, MDEQ initiated low level testing methods for metals in ambient water
- Trends in the Trenton Channel show PCB levels may be declining
- Mercury levels tend to increase within the Trenton Channel
- There are no clear trends in contaminant concentrations in ambient water for the whole River throughout the 1990s

CHAPTER 4

Sources and Loadings

4.1. Loadings to the Detroit River

The Detroit River receives and transports pollutants and toxic substances from various and wide-ranging sources. Among the sources that were summarized in the 1996 RAP Report are: upstream inputs; input from several stream tributary systems; sanitary and storm sewage treatment facilities; private industrial outfalls; and NPSs including: soil erosion, urban runoff, rural storm water, air deposition, spills and illegal discharges, landfills, and household hazardous waste.

4.1.1 Input From Several Stream Tributary Systems. There are eight main tributaries to the Detroit River. On the US side, they are the Rouge River, Ecorse River, Monguagon Creek, Frank & Poet Drain, and Brownstown Creek. On the Canadian side, they are the Little River, Turkey Creek, and Canard River (Figure 1). The Rouge River presents the largest load of contaminants to the Detroit River. According to the Rouge River National Wet Weather Demonstration Project database, 1994 to 1998, the estimated average daily loading in kilograms per day from the Rouge River were 0.35 cadmium, 5.3 copper, 0.2 mercury, 4.1 lead, 27 to 71 zinc, and 0.17 PCB. Table 3 shows mean water flow rates of Detroit River tributaries.

Additionally, Ecorse Creek is in a non-attainment status for the presence of pathogens and untreated sewage discharges and poor macro invertebrate communities. Non-attainment indicates that the criteria pollutant levels consistently exceed state and federal standards (MDEQ 303d list, 2000).

Canadian tributary loading data consists of the amount of suspended sediment, by tonnes, which enters the Detroit River and flows into Lake Erie. In 1997, on average, four percent of the suspended sediment load into Lake Erie came from the three main Canadian Detroit River tributaries (DRCCC 1999).

Table 3
Tributary Mean Flow in Cubic Feet/Second (cfs)

Tributary	Flow	% Tributary Contribution
Rouge River	1090	88
Turkey Creek	54	4.3
Ecorse Creek	29	2.3
Brownstown Creek	22	1.8
Frank & Poet Drain	16	1.3
Little River	15	1.2
Canard River	12	0.96
Monguagon Creek	1.7	0.14
Total	1239.7	

The Detroit River flows at 185,000 cfs at its head and supplies 186,240 cfs to Lake Erie at its mouth.
Source: USGS

4.1.2 Sanitary and Storm Sewage Treatment Facilities. From 1999 to 2001, there has been a total release of 10.5 billion gallons of CSO into the Detroit River (EPA, 2001) from American sources. In March 2000, U.S. EPA and City of Detroit reached a \$1 billion settlement agreement concerning CSO's. A major component of the settlement will be a 7.5-mile wastewater detention tunnel to be built under the City of Detroit. Other on-going CSO control improvements undertaken by Detroit Water and Sewer Department (DWSD) since 1996 include: plans to build a new wastewater treatment plant to augment three plants in existence; additions of special gates and dams to increase the capacity to hold wastewater; an expansion of the main Jefferson Avenue treatment plant; construction of a retention basin at the Conner Creek outfall; and construction of two disinfecting facilities at Chene and Leib. DWSD's final goal is to capture and treat 1.7 billion gallons of wastewater every day as opposed to the current capacity of 1.2 billion gallons per day (Schabath and Pearce, 2000).

In 1992, the City of Windsor commissioned a study to investigate direct municipal discharges to the Detroit River from the Riverfront area within the City boundaries and north of Riverside Drive. In follow-up, the City commissioned a study to develop a pollution control strategy for the Windsor Riverfront District with the specific objective of reducing CSO and total pollutant loadings to the Detroit River. The Phase 2 study evaluated options to develop a pollution control plan (PCP) for the Riverfront District to satisfy regulatory guidelines for CSO control and to reduce the pollutant loadings to the Detroit River to levels consistent with the RAP objectives and acceptable to the public.

An additional critical criterion is that the pollution control measures must not increase basement flooding. The City of Windsor has adopted the OMOE guidelines for CSO control. The specific target of these guidelines is that ninety percent of the wet weather flows from the combined sewer system is to receive at least primary level treatment defined as fifty percent reduction of suspended solids loads and thirty percent reduction of carbonaceous BOD loads. Based on the conclusions of the Phase 2 study, cost considerations and the input from the public, the retention/treatment basin option was selected as the preferred option for CSO control in the Riverfront District. Three Retention-Treatment Basins (RTB's) 7,200m³, 12,000m³ and 5,000m³ in size are to be constructed at the Hiram Walker, Marina and Caron Avenue sites, respectively, to control overflows upstream of Caron Avenue. Tunnel storage downstream of Caron Avenue, consisting of approximately 4.8 km of 2.5m diameter pipe paralleling the Riverfront Interceptor, is also to be constructed. The purpose of the Phase 3 study was to develop an implementation strategy for the City of Windsor PCP. This has been done in the context of City-wide pollution control programs, regulatory requirements, City of Windsor's financial resources, and public input. The Phase 3 study identified the need to consider all of the on-going and proposed programs and the resources required for each. In addition to CSO control, other proposed pollution control measures for the City include upgrading the West Windsor PCP to secondary treatment, extension of the Riverfront interceptor sewer and upgrading of the Caron Avenue pumping station.

The Canada/Ontario Agreement identifies the West Windsor Pollution Control Plant (WWPCP) as one of the facilities bordering on the Great Lakes that will be required to provide Best Available Treatment Economically Achievable (BATEA). An outcome of the study was that the total cost of the PCP works including CSO control, upgrading the WWPCP to secondary treatment and related works would amount to approximately \$184 million. (City of Windsor Pollution Control Plan Financing Study, Draft, EC, 2000). Funding is being sought from all levels of government for this, however the City is proceeding with the CSO retention-treatment basin project, supported with funding from Environment Canada.

4.1.3 Private Industrial Sources. In preparation for this Update Report, Environment Canada arranged for analysis of the point sources which are responsible for 95% of the discharges to the Detroit River. This effort was undertaken to enable comparison with data from the 1996 Update Report. Available point source data were collected from U.S. and Canadian municipal and industrial dischargers and used to estimate these loadings in the same manner as previous studies. Although much of the data were incomplete, load estimates made for 1994-1997 showed that decreases in point source loading have occurred for cadmium, copper, and zinc compared to historic loads. However, increases have been experienced for lead, mercury, and PCBs (State of the Strait Proceedings, 2001).

During the data collection exercise, it was observed that the data being reported were becoming less and less useful for load estimation. Although the load estimation

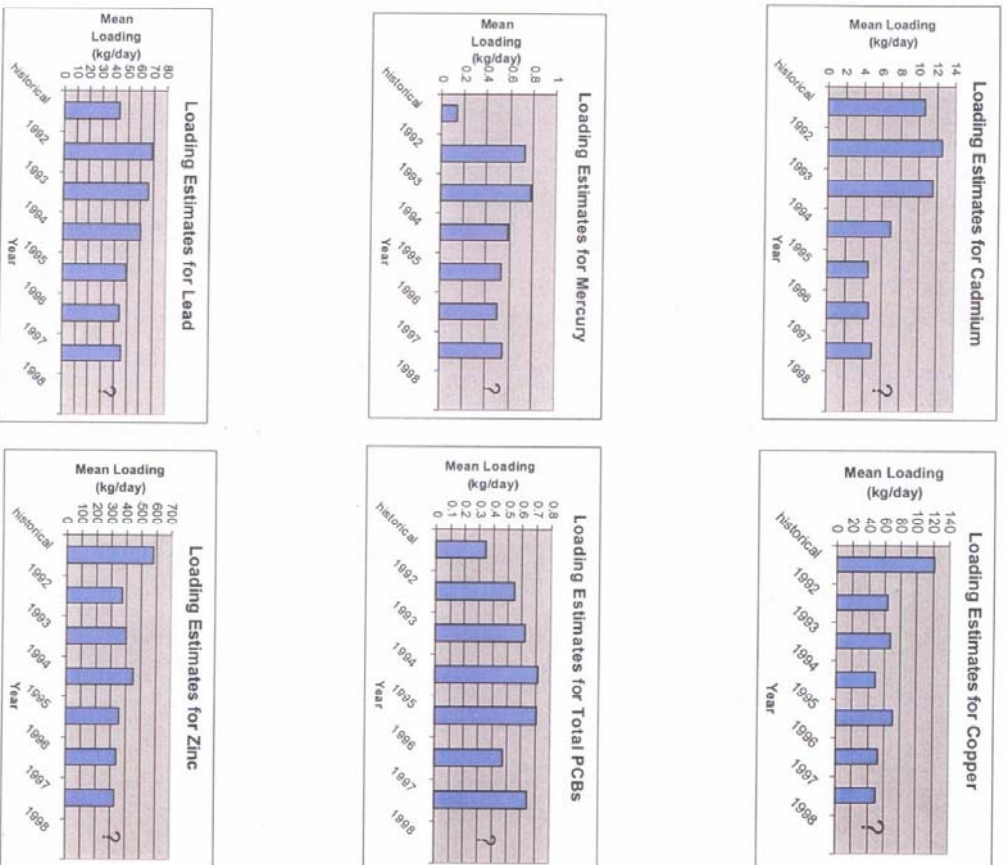
methods used allowed for some censored data (non-detects), data from later years (e.g., 1998) were such that no estimate was possible (State of the Strait Proceedings, 2001).

To supplement this data, loading data from U.S. EPA's Permit Compliance System (PCS) is presented in Appendix D. The PCS is a data base of contaminant discharges based on each facilities' discharge permit requirements. Often, these numbers are averages based on daily, weekly, or monthly sampling. Since the numbers presented in Appendix D have been generated by a different method than used above, and the 1996 RAP Update, it is presented here only for information and cannot be compared to other values.

In comparing the PCS generated numbers across time, 1994 - 1998, in general, it appears the levels of cadmium and copper have been on a gradual decline, and the mercury levels do not show much change from 1994-1996. Data for mercury from 1997 and 1998 are not usable due to a high number of non-detect values. The PCB data do not indicate much change from 1994-1997, and zero detection data for PCBs was reported in 1998. Lead and zinc began to show a down trend in the 1990s then seem to dropped off uncharacteristically in 1998.

MDEQ has adopted new lower method detection limit for mercury (0.03ug/l) which will be required from permit holders when their permits are renewed. In the future, this will enable quantification of mercury loading from discharge facilities. Further, as a result of efforts to determine point source loading for this report, it has become clear that further attention to monitoring data is warranted.

FIGURE 4
Point Source Loadings for Metals and PCBs in 1990s



Source: Dolan, 2001

4.1.4 Non-point Source Discharges. There is much to be understood about non-point sources, e.g. urban storm water runoff, brownfields, illegal dumping. These areas are becoming the focus of much more attention. In the U.S., funding for grants to states to deal with NPS has almost doubled since 1998 (GAO, 2000). The 1996 RAP Report identified NPS problems affecting the Detroit River, they included: soil erosion, rural storm water, urban runoff, air deposition, spills/illegal discharges, and landfills.

Soil erosion and rural storm water runoff are a larger problem in Ontario than Michigan because sixty-eight percent of Ontario side of the River remains primarily agricultural (DRCCC 1999), whereas the American side is primarily urban. Since 1996, ERCA and EC have been working on a rural NPS pollution remediation program. To date, ERCA has developed a GIS based model to predict soil erosion prone areas within the Detroit River AOC. These areas have been targeted for education/outreach and grants to promote erosion control practices. Since the beginning of the effort, there has been a 30% increase in no-till farming and presently 55% of the agricultural acreage in the AOC is involved with no-till farming practices. In addition to the no-till success, 131 additional other erosion control projects have been undertaken, including tree planting, installation of buffer strips, rock chutes, and septic upgrades. The soil erosion model will be used in the future to quantify the amount of soil that is being lost as runoff to surface waters (Child, 2000).

Direct urban storm water runoff to surface water bodies is a major concern on the American side of the River. Impervious surfaces such as roads, parking lots, and buildings increase the velocity and volume of storm water runoff. Runoff from impervious surfaces impact all parts of the river system with increased flow and pollution loads it carries with it. Local municipalities are responsible for the local zoning decisions, which govern land use. Many of the municipalities in Southeastern Michigan fall under new Federal stormwater regulations. These regulations require certain municipalities to control stormwater discharges and reduce the amount of pollutants entering surface waters from non-point sources. Municipalities must obtain stormwater discharge permits by 2003 and, in addition, implement local stormwater management programs. For more on American stormwater regulations see <http://www.deq.state.mi.us/swq/>.

Air pollution results in fallout of contaminants (atmospheric loading) that impact the Detroit River. In 1996, 2,720 metric tonnes of air pollutants were reported released from sources in Windsor and Essex County (DRCCC, 1999). According to U.S. EPA's Toxic Release Inventory (TRI) data, among many other types of air pollutants, in 1996, 29,788 tons of particulate matter was released into the air from sources in Wayne County, Michigan. Particulate matter is one type of pollutant that can eventually wash into surface waters increasing the loading to the Detroit River watershed from the atmosphere.

The number of spills reported to the US Coast Guard and the Province of Ontario have not varied significantly since 1995, with a high of thirty-nine reported in 1996 and a low

of thirty in 1998 (see Appendix E). Although it is difficult to assess illegal discharges, U.S. EPA has stationed three Environmental Criminal Investigators in Detroit since 1996. Since that time, they have discovered many incidents of illegal discharges including two involving major Detroit disposal companies who were allegedly discharging illegally into the sanitary sewer system. Another source of illegal discharges are illicit connections to storm water sewers. Many municipalities are instituting illicit discharge programs to identify and correct this problem.

The impact of landfills on groundwater and impacted groundwater on surface water is a difficult non-point source to quantify. Modern landfills are regulated and engineered to eliminate releases to the groundwater, and gaining an understanding of groundwater pathways to surface waters can be very complex, so the assessment of how much material is deposited into a landfill annually may not be a helpful indicator to assess impacts to surface water. However, there are many old non-regulated and unlined landfills, or dumps, that may be contributing to water pollution. Many have yet to be discovered or evaluated, therefore, the impact of these land based non-point sources can not be quantified at this time. There is, however, information on reported releases of pollutants to land (as opposed to landfill disposal) on a yearly basis. In the 1996 Canadian National Pollutant Release Inventory, 6.4 tonnes of pollutants were reported released to land in Essex County, Ontario, (DRCCC, 1999) and the U.S. TRI reported a total of 7 tons of pollutants released in Wayne County, Michigan.

Sources and Loading Summary of Progress/Status

- Major CSO construction and evaluation projects in Detroit and Windsor have been undertaken since 1996
- CSOs continue, however, as basin construction is underway
- Currently, point source loading is difficult to quantify, however levels of cadmium, copper and zinc appear to be decreasing; levels of lead, mercury and PCBs are unchanged or slightly increasing
- A new lower detection limit for mercury in discharge water has been adopted by MDEQ
- Erosion control efforts in Ontario are reducing the amount of soil migrating into tributary waters
- Efforts to evaluate non-point sources of contaminants are underway

CHAPTER 5

Sediment and Benthos

Sediment quality is a major concern in the Detroit River. In some areas, sediments can act as a contaminant sink, trapping and holding contaminants, and in other areas, sediments may be subject to erosion and have high enough levels of contaminants to be considered point sources. Benthic communities are degraded throughout most of the Detroit River, particularly in deposition zones below former industrial sites and CSOs. The majority of the severely impacted zones are along the lower U.S. shoreline. The degraded benthic communities are generally dominated by pollution tolerant species (USACE, 2000).

5.1 Sediment Contaminants - Types and Sources

Trace metals, PCBs, and polyaromatic hydrocarbons (PAH) are the most commonly found contaminants in Detroit River sediments. PAHs can come from a variety of sources, such as: byproducts from incomplete combustion of coal, oil, and gas; coking byproducts; waste incineration; automotive exhaust; tar; soot; and runoff from asphalt and roads. PCBs, which were banned in 1979, can still be found in old transformers, lubricants, and hydraulic fluid. Trace metal contamination can come from batteries, ceramics, metal coating, sludge disposal, electrical industry, algal control, paint, dyes, pesticides, galvanizing, coal and waste combustion, along with many other industrial sources. The dominant factor that may be influencing the concentration of cadmium, copper, lead, and mercury in sediment appears to be the presence of urban land in drainage areas to the River (USGS, 2001).

In general, contaminant loadings have declined two- to three-fold between the 1980's and 1990's for mercury and PCBs (USACE, 2001). While source controls appear to be having a positive effect, several major sediment deposition zones in the Detroit River remain highly contaminated with heavy metals and synthetic organic chemicals (Table 4).

Table 4
Contaminants Identified in the Trenton Channel Project Sediment Surveys 1993 - 1996. (ppm - dryweight)

	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	PCBs, total	Oil and Grease	PAH
1996 RAP Sediment Quality Objectives	<0.6	<25	16	31	0.2	16	<90	0.01	<1000	4
Allied/Nicholson Slips	35	300	630	580	3.0	240	1200	12.7	71,000	93
BASF - lower Wyandotte Yacht Club	--	--	--	150	1.5	67	330	3.3	11,000	88.7
Firestone Steel Site	19	260	--	300	16	130	790	18.4	21,000	204
Federal Marine Terminal	40	500	--	352	9.9	210	846	11.2	--	41,200
Monguagon Creek Area	30	456		424	3.9	251	1200	12.3	9,000	218
Black Lagoon (Max)	30	418	--	547	11	206	3320	6.5	19,700	70.5
Trenton Towers (Max)	10	220	--	261	6.4	88	945	--	--	--
Elizabeth Park -- North Channel (max.)	15	270	--	279	7.4	100	842	10.3	26,200	57
Monsanto Outfall	13	205	--	272	1.6	--	1010	0.8	--	--
Elizabeth Park -- South Channel	13	225	--	347	5.1	102	1200	2.4	10,000	35
Monsanto Lagoon	16	193	--	246	3.9	89	996	0.9	--	--

*While studies have reported the distribution of contaminants in the lower reaches of the Detroit River, including the Trenton Channel, little information is available regarding contamination in the upper Detroit River (Kaman, 2001).

Source: MDEQ -SWQD, 1997. Results of the Trenton Channel Project Sediment Surveys 1993 - 1997.

5.2 Summary of Sediment Monitoring Results

The amount that contaminant concentrations are above sediment-quality guidelines indicates the potential harm to aquatic life. The link between the organism most at risk for impairment and exposure to the top layer of sediments is strong because benthic organisms and fish live in, or forage near, the surface of these sediments (USGS, 2001). Of the ten AOCs affecting the Lake Erie basin, Detroit River ranked fourth in severity of sediment contamination that can harm to aquatic life. The upstream AOCs of the Rouge and Clinton Rivers ranked second and third, respectively. The highest concentrations of mercury and zinc in sediments in the Lake Erie watershed are found in the Detroit River (USGS, 2001). PAHs, PCBs, arsenic, cadmium, lead, and copper were all found at various locations in the River at levels which would be harmful to aquatic life. The highest bed-sediment contamination was found in the Trenton Channel. Throughout the River, concentrations of pesticides and DDT were all found to be below harmful levels (USGS, 2001).

Within the Trenton Channel the sediment concentrations of most metals (PCBs, PAHs, and oil and grease) have been observed to decrease from upstream to downstream (Besser, 1996). However, there are areas of local contamination that will distort this general statement (Ostaszewski, 1997). The bio availability of heavy metals is greatest downstream from Trenton Channel sites (Besser, 1996). The areas of localized contamination in the Trenton Channel include the Firestone/BASF site and the Black Lagoon (Table 4). Sediments within Monguagon Creek, a tributary to the Trenton Channel, were dredged in 1997.

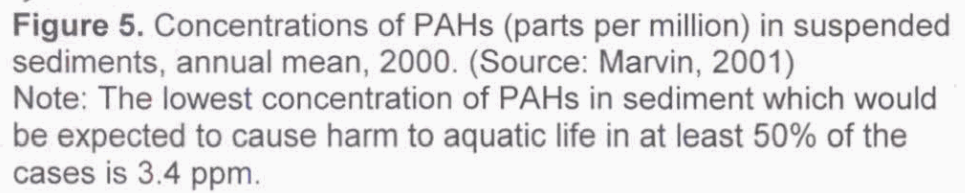
Environment Canada has been conducting a survey of contaminant concentrations in suspended sediments (see Chapter 7) throughout the Huron-Erie Corridor, with eight monitoring stations in the Detroit River. "The distribution of contaminants in the corridor reflects the urban and industrial land use patterns in the watersheds. For example, Figure 5 shows the distribution of concentrations of polycyclic aromatic hydrocarbons (PAHs) in the corridor. Sources of these contaminants are primarily related to combustion of fossil fuels and are predominant in areas of intense industrial activity. . . . Meanwhile, Figure 6 shows the distribution of mercury in corridor suspended sediments. In contrast to Figure 5, the distribution of mercury is more consistent through the Detroit River, Lake St. Clair and the lower reaches of the St. Clair River, indicating the potential influence of upstream sources of this pollutant from historical industrial activities" (Marvin, et al., 2001). Figure 7 shows increasing concentrations of PCDD/PCDF (dioxin) and dioxin-like PCBs moving downstream through the Trenton Channel. Highest concentrations of all three compound classes were detected at a site near Monguagon Creek. Levels of contaminants in the Trenton Channel were elevated compared to a site on the eastern side of the river near Fighting Island. The Fighting Island site exhibited values similar to stations upstream and in southern Lake St. Clair. There is also noticeable influence of the Trenton Channel by elevated contaminant

levels at a site just below the Trenton Channel outflow to Lake Erie (Marvin, et al., 2001).

5.3 Benthos

Dredging of existing shipping lanes have had a significant impact on the surrounding channel sediments which, in turn, affects benthic communities. Certain areas of the river with certain substrate type are more susceptible to impact due to the River currents and contaminants in the suspended sediments.

Benthos, bottom-dwelling invertebrates, are effective monitors for certain contaminants, and adult insects are an excellent indicator of overall local contaminant levels in aquatic habitats (Corkum et al., 1997). Body burden of PCBs and DDE in *Hexagenia* (May Fly) were lower in Detroit River samples than in Lake Erie sites. These samples were taken along the shoreline in Windsor, Wyandotte, and Amherstburg (Corkum). Levels of PCB in *Hexagenia* from the Detroit River did not change significantly from 1987-1994 (Corkum). However, there remains substantial areas, such as the Trenton Channel, where the benthic communities still indicate degraded water/sediment quality conditions (SOS, 2001). Overall, *Hexagenia* populations in Lake Erie continue to improve (Corkum).



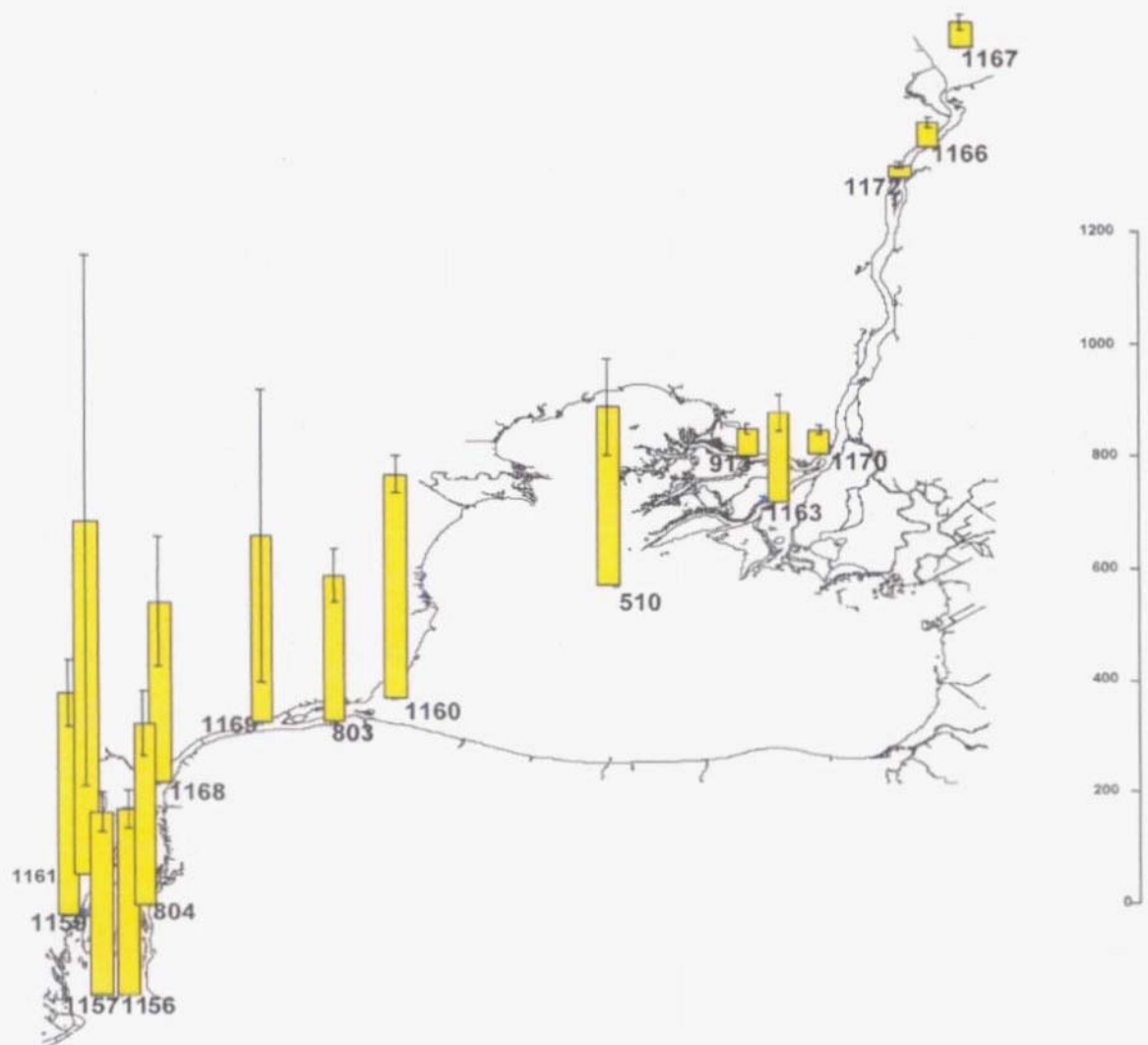


Figure 6. Concentrations of mercury (parts per billion) in suspended sediments, annual mean, 2000. (Source: Marvin, 2001).

Note: The lowest level of mercury in sediment that would be expected to cause harm to aquatic life in at least 50% of the cases is 486 ppb.

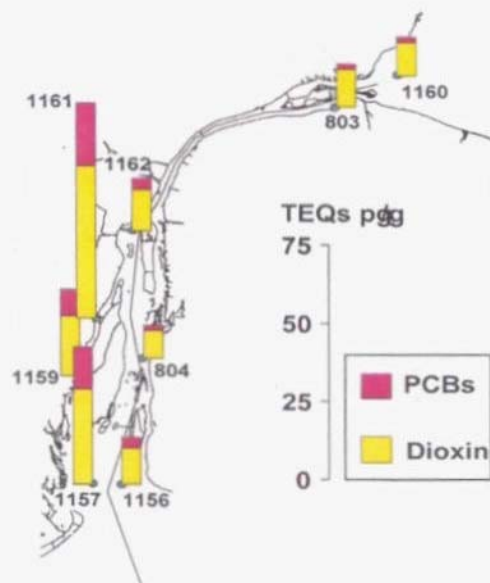


Figure 7. Spatial distribution of toxic equivalents of co-planar PCBs and polychlorinated dibenzo-*p*-dioxins and dibenzofurans (parts per trillion) determined in suspended sediments from the Detroit River. Annual mean, 2000. (Marvin, et. al., 2001)

Note: The lowest level of these compounds in sediments that would be expected to cause harm to aquatic life in at least 50% of the cases is 21.5 ppt.

5.4 Conclusion

The zonation of degraded sediment quality in the Detroit River is generally known and consistent for the past 20-25 years (Kreis, 1999). The sediments continued to be the most contaminated along the Michigan mainland shore in deposition pockets. The near shore area between Monguagon Creek and Elizabeth Park is the most severely degraded in the Trenton Channel (Kreis, 1999).

Without contaminated sediment remediation many problems can be expected to continue. These problems include the persistence of known heavy metal and organic contamination, continuation of fish consumption advisories, and degraded benthic communities (USACE, 2000). Remediation of sediment hot spots will positively contribute to the restoration of BUI.

Sediment and Benthos Summary of Progress/Status

- In 1997, over 30,000 cubic yards of contaminated sediments were removed from Monguagon Creek
- Over 30,000 cubic yards of contaminated sediment will be removed from the Trenton Channel and 146,000 cubic yards from Connors Creek CSO pending resolution of disposal issues
- Since 1999, GLIER and EC have been conducting a sediment study of the entire river

CHAPTER 6

Fish and Wildlife Habitat

6.1 Fish and Wildlife

6.1.1 Fish. Currently, sixty-five native and exotic species of fish live in the Detroit River. At one time, there were 105 other species inhabiting or migrating through the River (USACE, 2000). Fish consumption advisories apply to the Detroit River for carp, freshwater drum, northern pike, redhorse sucker, walleye, and yellow perch, because of PCB contamination. The drum and walleye are also restricted for their mercury concentration and carp are also high in dioxin concentrations. In the Spring of 2000, GLIER reported that muskellunge in the Detroit River still exceed human consumption guidelines for mercury and organic contaminants, including PCBs. Liver tumors at levels exceeding background have been found in five species of fish (USACE, 2000). Four species of rare fish in Ontario are found in Detroit River wetlands, including the striped shiner, pugnose minnow, spotted sucker and green sunfish (www.epa.gov/solec/96).

Current American fish advisories can be found at www.mdch.state.mi.us/pha/fish and Canadian advisories can be found at www.ene.gov.on.ca/envision/guide/lerie99.pdf.

6.1.2 Birds. The Detroit River is an important habitat and migration flyway for birds. Twenty-seven species of waterfowl are found in the Detroit River's wetlands, and at least seventeen species of raptors live in, or migrate through, the area. More than forty-eight other bird species are resident or migrate annually along the river. Although there are no documented bird or animal deformities associated with the Detroit River, a study of ducks has concluded that the Detroit River/Western Basin of Lake Erie corridor remain a major source of PCBs to migrating ducks (USACE, 2000).

6.1.3 Reptiles and Amphibians. Many species of reptiles and amphibians inhabit Detroit River wetlands. These coastal wetlands offer especially important habitat since the surrounding landscape has been dramatically altered. Four rare species of reptiles have been identified in these wetlands including the eastern fox snake, eastern massasauga rattle snake, queen snake, and the eastern spiny softshell turtle (www.epa.gov/solec/96).

6.2 Habitat

The wetlands in and around the Detroit River provide the most significant habitat related to the River. Along the Canadian shore, five coastal wetlands have been identified by OMNR. These areas are primarily in the middle reaches of the River and total 1,136 hectares (SOLEC, 1996). The Detroit River Marshes near Fighting Island

represent the largest wetland complex, with two smaller wetlands on Peche and Fighting Island. The remaining wetlands are associated with tributaries, including the Canard River wetland complex and the Turkey Creek Marsh (SOLEC, 1996). The American wetlands are found downstream of Grassy Island or are associated with riparian zones around the twenty-one islands in the River. These areas correspond with the highest fish and wildlife habitat values that are found in the lower portion of the River. The Nature Conservancy designated these wetland areas as globally significant in 1994. Table 6 lists and describes most of the significant habitats along the Detroit River (DRCCC, 1999).

The state of coastal wetlands was presented at the 1996 State of the Lakes Ecosystem Conference (SOLEC). Conclusions at SOLEC 1996 indicate many human stressors continue to impact remaining wetlands, including erosion from ships wakes, shoreline modification, dredging and channelization, excess nutrients, contamination of water and sediments with toxic chemicals, agricultural and urban encroachment, and invasive non-indigenous species.

The Detroit River is the busiest waterway in the Great Lakes. The larger numbers of commercial and recreational vessels cause excess wave action, changes in shoreline currents, and erosion of wetlands along the shores. Shoreline hardening is the common solution to this erosion. Where this hardening occurs adjacent to remaining wetlands, it restricts their connection to upland habitats greatly reducing the diversity of habitats.

The shipping channel is dredged frequently for navigation, substantially changing the morphology of the River. Sediment dynamics in the River are changed, but it is not known how these changes affect the distribution and status of wetlands. Dredging and channelization associated with the numerous smaller marinas, canals, and boat slips also stresses remaining wetland area through wetland loss, fragmentation, changes in sediment dynamics and increased erosion from wave action (www.epa.gov/solec/96).

Toxic effects and bio accumulation are important stressors to plants and animals in wetlands in the Detroit River. Wetlands and other near shore habitats are especially vulnerable to toxic substances since they are deposition zones for sediments. Submergent plants have been found to concentrate these contaminants and are used as food sources for fauna, including waterfowl. (SOLEC, 1996).

Several exotic species are present in the River wetlands and affect the composition and structure of wetland communities. Invasive plant species of concern include Eurasian water milfoil and curled pondweed (SOLEC, 1996).

Table 5
Mean Contaminant Concentrations in Walleye and White Bass Whole Fish Samples Collected from 1996-1998.

(All Chemical Concentrations are in mg/kg.)

Chemical	Year	Detroit River							
		Upper				Lower			
		Walleye		White Bass		Walleye		White Bass	
		Mean Length (cm)	Average Concentration	Mean Length (cm)	Average Concentration	Mean Length (cm)	Average Concentration	Mean Length (cm)	Average Concentration
Mercury	1996	36.52	0.18			46.23	0.24		
	1997	45.17	0.41	31.11	0.14	45.42	0.34	30.78	0.14
	1998	42.77	0.29			47.74	0.38		
Total PCB	1996	36.52	0.36			46.23	0.14		
	1997	49.40	0.12	31.12	0.27	49.61	0.14	30.75	0.31
	1998	40.67	0.11			51.26	0.148		

Source: Chuck Cox MOE Sport Fish Contaminant Monitoring Program

6.3 Trends

6.3.1 Fish. MDEQ fish contaminant monitoring shows that, over the period 1990 to 1998, the mercury concentration in Detroit River carp decreased and the mercury concentration in Lake Erie carp increased. Walleye sampled in Lake St. Clair, the Detroit River, and Lake Erie showed no significant change in mercury concentration over this time period.

Compared to the St. Mary's River, carp and walleye from the Detroit River had higher concentrations of total PCB, total chlordane, and total DDT, but lower concentrations of mercury. All species for the Great Lakes and connecting channels tend to have higher concentrations of chlorinated organic contaminants than the same species from inland lakes (MDEQ, 1999).

There continues to be fish consumption advisories in the Detroit River. There are advisories for carp, freshwater drum, walleye, northern pike, yellow perch, white bass, rock bass, and channel catfish. Draft Ontario consumption advisories for 2001-2002 indicate an improving status for the consumption of walleye, otherwise, since 1996 there are no other apparent trends in the type of fish advisories issued.

6.3.2 Birds. For more than a quarter of a century, the Canadian Wildlife Service - Ontario Region has maintained two Great Lakes monitoring programs for colonial waterbirds. One program monitors contaminant levels in herring gull eggs, and the second, jointly with the U.S. Fish and Wildlife Service, monitors breeding populations of colonial waterbirds. These programs identify and track trends of toxic chemicals in birds who prey on fish in the Great Lakes food web and the effects of those chemicals on bird population levels (SOS, 2001).

Herring gull eggs are collected from Fighting Island and analyzed for PCB, DDE, mirex, dieldrin, hexachlorobenzene (HCB), heptachlor epoxide (HE) and 2,3,7,8-TCDD. All seven compounds have declined 78 to 93% between when they were first measured in 1978 to 2000. The pattern of the decline, however, has varied among compounds. DDE and HE have declined at a constant rate, but Mirex and dieldrin showed no significant trend from 1978 through the mid-1980s, but have recently declined significantly. PCBs have declined from 1978 through 1996, but there has been no significant trend since then. Concentrations of 2,3,7,8-TCDD decreased by 50% from 1995 to 1996, however, there have been no significant trends before or after that decrease. HCB levels declined significantly between 1978 and 1997, however, since then they have increased and levels in 2000 were comparable to levels measured in 1996 (SOS, 2001).

For the population surveys, the species studied included were: double-crested cormorant, ring-billed gull, herring gull, great black-backed gull, common tern, and caspian tern. In 1997-99, the Detroit River was home to approximately 92,000 breeding gulls and terns. In the last 23 years, the number of ring-billed gull nests has increased more than 600-fold and herring gulls 4.6-fold while the number of common tern nests has declined by 98%. No cormorants, black-backed gulls, or caspian terns were found nesting in the Detroit River, nor are there any historical nesting records of them. Great egrets and great blue herons used to nest on Stoney Island but have not been recorded there since 1977 (State of the Strait, 2001).

The DRCCC 1999 Report presents a study which determined that concentrations of PCBs and DDE in Lake Erie eagle eggs declined significantly between 1974 and 1994, similar to a decline found in herring gull eggs. However, PCB, DDT, and DDE concentrations in eaglet blood have remained relatively stable between 1990 and 1996. There have been no studies on eagles in the Detroit River since 1996. However, effects on eagles in Lake Erie can be helpful in indicating conditions in the Detroit River. No indication that contaminants adversely affected productivity in bald eagle populations from the north shore of Lake Erie between 1990 and 1996 was found. In fact, the study reported that the number of active nests increased substantially between 1980 and 1996, with the most rapid increase between 1987 and 1993 (Donaldson et al., 1996). They also found that "all Lake Erie eagle eggs sampled from the 1970s had PCB levels high enough to be toxic to developing eagles; however, none of the eagles studied in 1990 had PCB levels that high" (Great Lakes Institute for Environmental Research, 1999). The study did, however, find some indication that contaminants are still playing a role in limiting eagle numbers. For example, 67% of eggs collected from 1989 to 1994 still had DDE levels exceeding the level at which moderate eggshell thinning occurs.

6.3.3 Habitat. Nearly all of the riparian wetlands have been lost to urban growth. Approximately 3% of the original wetlands remain. The vast majority of the forests and wetlands within the watershed have been converted to agricultural and urban land use. Since 1815, over 95% of the upland forests, 96% of the Canadian wetlands and 97% of the American wetlands along the River have disappeared due to drainage for agricultural and urban development. Of those wetlands that have been preserved, poor water quality and excessive sedimentation affect the quality of the resource (DRCCC, 1999). A number of critical habitats have been identified, which are located mostly in the lower reaches of the River (see Table 6).

No comprehensive monitoring program exists to track extent of current wetland loss along the shores of the Detroit River (MDEQ, 2001). Today, about 13% of the U.S. shoreline of the River has been undisturbed. Approximately 80% of the Canadian shoreline, mostly in the lower River, remains undisturbed. The remaining wetlands are mostly found around islands in the River. In recent years, loss of wetland along the

shores had slowed but continues. Incremental loss from activities such as urban encroachment, shoreline modification, marina development, and agricultural conversion are still a concern (SOLEC, 1996).

Table 6
Critical Habitats on the Detroit River

Feature	Size	Comments
Canard River Mouth Marsh	416 ha (1031 ac)	Class 1 Provincially Significant Wetland; largest wetland in the Detroit River. Supports at least 5 rare species. A series of dikes allows the water level in the marsh to be controlled for optimal waterfowl production. This large, undisturbed, and clean marsh provides excellent habitat for both breeding and migratory waterfowl and is well known as a highly significant Canvasback Duck staging area.
Canard River Scout Camp Forest	90 ha (223 ac)	This site contains the most extensive tract of upland forest on the Canard River, as well as some floodplain forest. The upland woods are of high quality, and support at least 20 rare tree, shrub, and plant species.
Canard River Kentucky Coffee Tree Woods	180 ha (445 ac)	supports at least 30 rare species. This site is one of a long link of wooded areas along the Canard River that provide an extensive wildlife corridor. The presence of Kentucky Coffee Trees in this community, especially since they have abundant regeneration (only site in Canada with both male and female trees), makes this site significant.
Ojibway Prairie Complex	245 ha (606 ac)	Constitutes the largest protected tallgrass prairie in Ontario and thus affords an important ecological refuge for a vegetation complex which once typified a significant portion of North America. Approximately one half of the prairie species known in Ontario occur within the Ojibway Prairie Complex. This area is of great interest because mesic prairie is most difficult to find and is best represented in this location. Contains at least 70 rare species making it one of the most significant sites (from this perspective) in all of Ontario.
Allied Chemical Brine Wells (salt-rich soils)	135 ha (334 ac)	Home to over 30 rare species. The extraction of sub-surface salt, in the form of brine has led to the establishment of a very unusual vegetation community dominated by some of the best assemblages of halophytic (salt-tolerant) plants in Southern Ontario. Ditches and pools of saline water are found on parts of the site, which provide excellent habitat for migrating shorebirds and ducks.
LaSalle Woods	94 ha (232 ac)	Supports more than 50 rare species. This number is mainly due to the unusual diversity of prairie plants (75 species), which are very localised in Ontario and Canada. In addition 38 tree and 40 shrub species are found here. The presence of six oak and four hickory species is also unusual, as these species reach their peak diversity to the south of Ontario.
Ojibway Black Oak Woods	48 ha (118 ac)	Supports at least 50 rare species. This significant and unusual woodlot contains a large number of rare plants, particularly prairie species. This woodlot is the finest example of an open Black Oak woods seen in the County.
Spring Garden Road Prairie	146 ha (360 ac)	Supports at least 75 rare species. Prairie remnants of this quality are very scarce in Canada. Several plants growing at this site may have their entire Canadian range restricted to the Windsor area. Ojibway Prairie Complex, LaSalle Woods, Ojibway Black Oak Woods and Springarden Road Prairie can be considered to form a linkage system through the Windsor area.

Feature	Size	Comments
St. Clair College Prairie	15 ha (38 ac)	Supports more than 20 rare species. Although small, the site exhibits surprising diversity. Low, sandy knolls support both upland hardwoods as well as tallgrass prairie species. Loamy soils between the knolls are poorly drained and support a lowland forest.
Reaume Prairie	14 ha (35 ac)	Supports more than 70 rare species. The most significant portion of this site is an area of remnant prairie. This open, sandy area, although only 0.6 hectares (1.5 acres) in size, contains an extremely high diversity of rare plants, mostly prairie species, some of which occur nowhere else in Canada.
Detroit River Marshes	575 ha (1424 ac)	Class 2 Provincially Significant Wetlands; primarily marsh (96%) with small pockets of swamp (4%); Due to the diversity found within the wetland many significant animal species are known to exist. The interspersed open water types indicate that the wetland is very diverse. An abundant amount of both flora and fauna are found at the site. The diversity of the surrounding habitat helps to attract wildlife to the wetland.
Peché Island	40 ha (100 acres)	Supports more than 20 rare species. There are four plant community "types" found on Peché Island: Wetland, Broadleaf Forest, Tall Shrub Thicket, and Beach. Large numbers of various bird and plant species can be found on the island due to the high degree of habitat diversity present.
Fighting Island	149 ha (368 acres)	Supports more than 15 rare species. Class 3 Provincially Significant Wetland. A wetland and the surrounding upland forest at the north end of the island comprise the significant natural area. Towards the south end of Fighting Island are nesting colonies of Gulls and Terns. Because of the size and location within the Detroit River, the marsh is used as a feeding stop for migratory waterfowl.
Turkey Creek Wetlands	32 ha (79 acres)	Class 3 Provincially Significant Wetland. Although the site is not aesthetically distinct from the surrounding area, it attracts an unusual amount of wildlife. Many significant species utilise the wetland for feeding or for breeding habitat. Marsh Wrens, Black-crowned Night-herons, Eastern Fox Snake, and the Massasauga Rattlesnake can all be found at Turkey Creek. Significant plant species are also found at the site are Ohio Spiderwort and Ironweed.
Humbug Marsh	28 hectares (70 acres)	Part of site presently protected by Conservation Easement. Owned by the State of Michigan. Site of remnant Oak Savannah and native prairie. Essential habitat for migratory raptors, American Bald eagle (endangered), neotropical birds, northern pike spawning area. Now endangered by development.
Celeron Island	28 hectares (70 acres)	Currently owned by the State of Michigan. Habitat for (endangered) osprey and bald eagle, diving ducks, such as canvasback, redhead, scaup. Spawning site for numerous fish species, including walleye, northern pike, smallmouth bass, emerald shiner, and spottail shiner.

Feature	Size	Comments
Belle Island	399 hectares (982 acres)	15% forested with 3.5 km of canals and several lagoons, one of which (Blue Heron Lagoon) opens directly to the Detroit River. Resident population of wild, white tail deer and extensive wetland habitat for resident and migrant waterfowl. Two public fishing piers. Extensive nesting and resting habitat for neotropical birds.
Stony Island	41 hectares (101 acres)	Currently owned by the State of Michigan. Roughly equal parts Carolinian forest and coastal wetlands, utilised by large numbers of migrating swans, geese, and ducks and numerous fish species. Underlain by dolomite limestone, reputed spawning site for (threatened) lake sturgeon. Used by numerous species of migratory, neotropical birds and bald eagles (endangered). Breeding/nesting site for several frog and turtle species.
Grassy Island	29 hectares (72 acres)	Currently a federal Wildlife Refuge (U.S. Fish and Wildlife Service). Man-made, diked, confined disposal facility for contaminated dredge spoils from the Rouge River. Located on 566 hectares (230 acres) of gravel/clay shoals that support extensive beds of submersed wild celery (<i>Vallisneria</i>) and reputed spawning site for (threatened) lake sturgeon. Uplands are predominantly colonised by giant reed grass (<i>Phragmites</i>), willow, cotton, maple, and cherry trees, and cattail marshes around two ponds. Habitat for white tail deer, racoon, gray fox, muskrat, woodchuck, red-tail hawk.

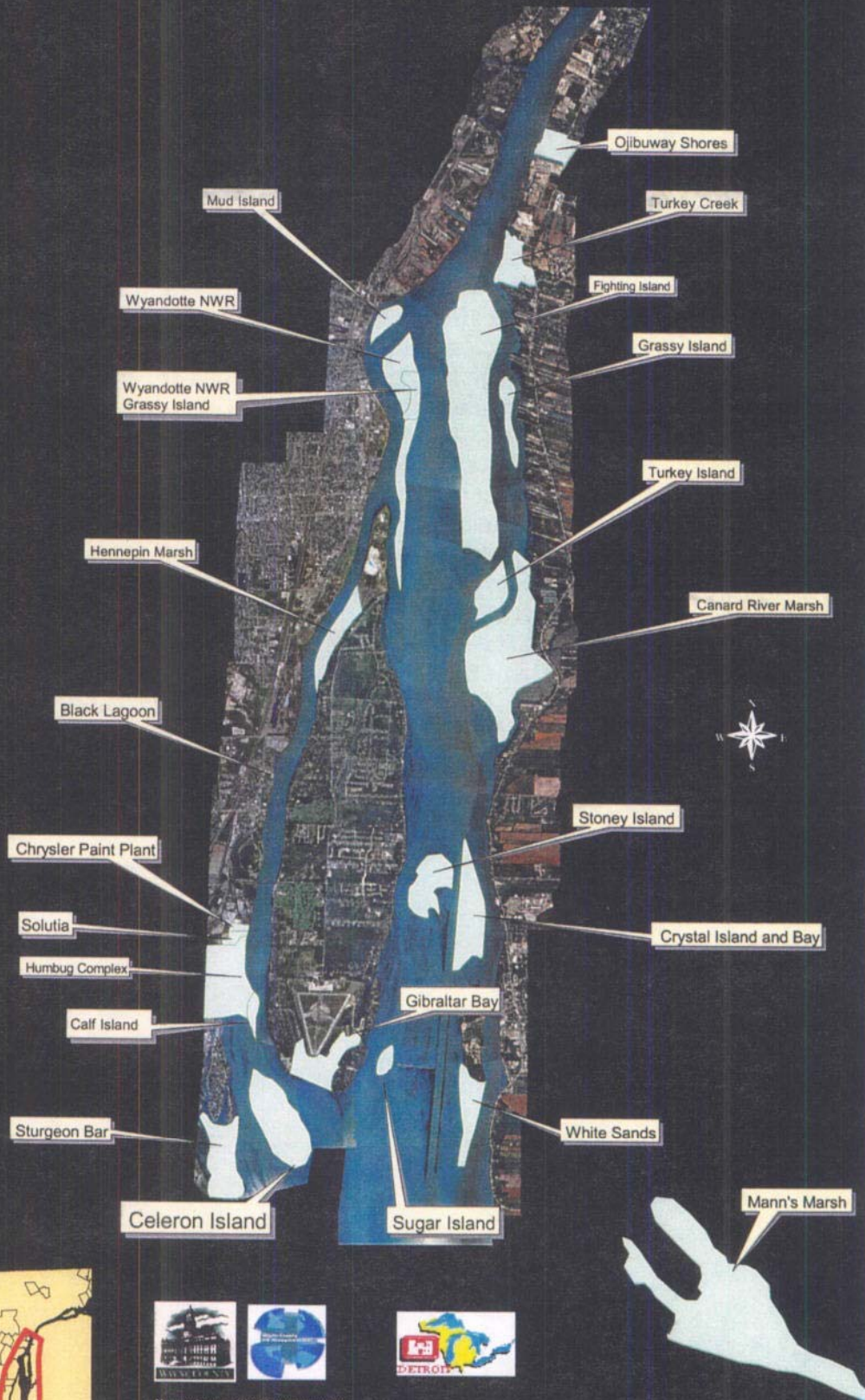
Source: DRCCC, 1999.



Lower Detroit River Ecosystem

Examples of Ecologically Significant Features and Areas

Map ne
update
disregard



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Office of the County Executive

Fish, Wildlife, and Habitat Summary of Progress/Status

- There have been no significant change in fish consumption advisories for the Detroit River.
- Walleye in the Detroit River and Lake Erie showed no significant change in mercury concentration from 1990 to 1998.
- The number of active bald eagle nests around Lake Erie has increased substantially from 1980 to 1996.
- Since 1990, 524 hectares of wetland have been protected or restored in the Detroit River watershed through land acquisition, regulation, and habitat enhancement projects.
- Essex County, Ontario, has developed a GIS-based Bio diversity Strategy, which identifies remnant habitat parcels throughout the county as part of a Canadian framework to identify conservation targets for habitat protection, restoration, and enhancement.
- Beginning in 1999, the United States has begun identification and mapping of candidate sites for habitat protection.
- There is no clear data on how much wetland has been lost since 1990. An accurate, comprehensive inventory of existing wetland does not exist in the United States.

CHAPTER 7

Monitoring

7.1 Monitoring Goals

In 1998, EC, U.S. EPA, OMOE, and MDEQ agreed to cooperate towards the restoration of the upper connecting channels' AOCs (St. Marys, St. Clair, and Detroit Rivers). The Four Agencies established a Monitoring Committee in 2000 to work with the local RAP Implementation Committees and other Federal, state, and provincial agencies to develop a monitoring plan for each AOC, and a combined plan for St. Clair and Detroit Rivers. The monitoring plan will build on existing efforts, and optimize coordination, consistency, and effectiveness. The scope of the monitoring plan will include ambient and source monitoring programs. Convenient and timely access to appropriate information will be an expectation in order to biennially report progress towards the achievement of delisting criteria.

7.2 Description of Major Monitoring Efforts to Assess BUIs

There are a number of on-going monitoring projects being undertaken throughout the River (Four Parties, 2000), only the major efforts toward assessing BUIs are listed here.

7.2.1 *Michigan Department of Environmental Quality.*

Head and Mouth Ambient Water Quality Monitoring - This effort was started in 1969. On a monthly basis, samples are taken at preset stations at the head and mouth of the Detroit River to assess ambient water quality trends (see Figure 2) for 1992-1998 data on metals.

Michigan Fish Contaminant Monitoring Program - This is a state-wide monitoring program which goals are: sport fish consumption advisories, spatial and temporal trends, and effectiveness of pollution prevention and remedial programs. Since 1994, and every two years after, carp and walleye are collected in Detroit River near the U.S. Grassy Island and the whole fish are analyzed for a range of parameters (see Chapter 6 for data trends).

Monitoring for Waterbodies to Assess Attainment of Water Quality Standards (305b) - The MDEQ uses a rotating watershed cycle for surface water quality monitoring and National Pollutant Discharge Elimination System (NPDES) permit reissuance. Each of the fifty-eight major watersheds in the state is scheduled for monitoring and discharge permit reissuance at least once every five years. The Detroit River was evaluated in 1998. The monitoring strategy is designed to satisfy four goals:

- 1) assess the current status or condition of waters of the state and determine whether Michigan's Water Quality Standards are being met;
- 2) measure temporal and spatial trends in the quality of Michigan's surface waters;
- 3) provide data to support MDEQ water quality protection programs and evaluate their effectiveness; and
- 4) detect new and emerging water quality problems (the full report can be found at <http://www.deq.state.mi.us/swq/gleas/gleas.htm>)

Trenton Channel Sediment Contamination Monitoring - Sediments in the Trenton Channel of the Detroit River have been assessed from 1993-1996, with current emphasis on site-specific projects (see Chapter 5 for summary of results).

NPDES – Permit Compliance System (PCS) Discharge Monitoring - Under the NPDES, anyone discharging into a surface water body must obtain a permit. Permit holders must monitor their discharge according to their permit requirements and report the results to MDEQ on a regular basis. The PCS is a computerized database of information on water discharge permits, designed to support the NPDES (to query the PCS data base see <http://www.epa.gov/enviro/html/pcs/adhoc.html>).

7.2.2 Ontario Ministry of Environment

Tributary Monitoring Program - This program evaluates loadings from Turkey, Canard, and Little Rivers and collects information for compliance with provincial water quality objectives. Accomplished on rotating basin basis with the tributaries being monitored every three years. The Detroit River at its mouth is evaluated as a tributary to west basin of Lake Erie. Next sampling year is 2001.

Great Lakes Near Shore Monitoring and Assessment - This program surveys near shore water quality and sediment and benthos at the mouth of Turkey, Canard, and Little Rivers. The survey is accomplished on rotating basin basis. The Detroit River tributaries are monitored every three years. Next sampling year is 2001.

Databases on Industrial Self-Monitoring - Monthly or quarterly data from facility compliance monitoring programs.

Drinking Water Program - This monitoring program has been developed to provide current information on municipal drinking water. The program is designed to monitor levels of chemicals and establish trends, define and track the occurrence of new chemicals, provide data in support of drinking water standards setting, and assess treatment plant operations. The Windsor plant is tested four times annually. Samples are taken of raw and treated water and at three points within the distribution system.

Sport Fishing Program - The Sport Fish Contaminant Monitoring Program is the largest testing and advisory program of its kind in North America and has been ongoing for more than twenty-five years. The fish are analyzed for a variety of substances, including mercury, PCBs, mirex, DDT, and dioxins. The results are used to develop the tables in The Guide to Eating Ontario Sport Fish. In the last few years, annual Detroit River fish sampling has consisted of white bass and walleye (see Chapter 6).

7.2.3 Environment Canada

Water Quality Program - This is in the planning stage. Upstream/downstream, cross-channel and temporal variability are under investigation. Many water quality parameters are being investigated for inclusion based on upstream/downstream differences.

National Pollutant Release Inventory - A Federal program designed to collect comprehensive annual data on national releases to air, water, land, and transfer of waste of 176 specified substances (comparable data set to TRI).

Great Lakes Herring Gull Egg Monitoring Program - The program involves collecting egg samples from various colonial waterbird species from Fighting Island and Middle Sister Island, on an annual basis (see Chapter 6).

Bald Eagle Monitoring Program - Monitors population trends at sites in Lake Erie as warranted.

Suspended Sediments Project - To generate contemporary contaminant data of suspended sediments in the River and to contribute to a whole River characterization. Eight sites were sampled beginning in 1999 near known or suspected sources of contamination.

Great Lakes Precipitation Network - Bi-weekly precipitation samples collected at nine locations on the Canadian shoreline of the Great Lakes and analyzed for a number of parameters. Two stations are located relative to the Detroit River, one on the north shore of Lake St. Clair, and the other on Pelee Island.

7.2.4 U.S. Environmental Protection Agency

Beach Monitoring Program - The Beach Program aims to protect the health of beachgoers through assistance to state, and local health and environmental officials in designing, developing, and implementing beach monitoring and advisory programs.

Detroit River Sediment Survey - Great Lakes National Program Office has been supporting MDEQ on Detroit River sediment surveys.

TRI discharge monitoring - The TRI is a registry that tracks approximately 620 toxic chemicals. The Toxic Chemical Release Inventory reporting system requires certain businesses and Federal facilities to report the environmental releases (such as to air or water), off-site transfers, and waste management activities (such as recycling and energy recovery) of TRI chemicals to U.S. EPA and MDEQ on an annual basis.

**Monitoring Program Summary of
Progress/Status**

- In 1997, MDEQ developed a Strategic Environmental Quality Monitoring Program for Michigan's surface waters.
- In 1999, Michigan appropriated money from CMI for increased monitoring efforts.
- In 2000, the Four Agency Monitoring Working Group was formed.
- In 2000, EC established a Water Quality Program for the Detroit River.

CHAPTER 8

Outreach and Education Section

8.1 Most Recent RAP Related Activities

8.1.1 State of the Strait Conference, 2001. The State of the Strait conference was held at the University of Windsor on March 27, 2001. It brought together Canadian and U.S. researchers, natural resource managers, policy makers, students, and concerned citizens to review the status and trends of the Detroit River ecosystem. At this conference, the executive managers from U.S. EPA, MDEQ, OMOE, and EC reported to the public on the progress of efforts toward addressing restoration of the Detroit River.

8.1.2 Delisting Criteria Development, 2000. In the Detroit AOC, the process of developing delisting criteria began on July 27, 2000, when scientists from Canada and the United States gathered in Windsor. The goal of the meeting was to kick-off the delisting process. This involves assessing the status of beneficial use impairments as a preliminary step. For each beneficial use impairment, data sets — historic and/or current — are being identified that indicate impairment status, i.e.: either impaired or not. Short, medium, and long range goals to result in delisting of each beneficial use impairment are to be considered. Data/information requirements to indicate if and when goals are met are also being tracked. After the July meeting, three subcommittees were struck to draft delisting criteria.

On December 8, 2000, a meeting the three sub-committees was held to assemble the document. A revised document was developed during the meeting and circulated again before being sent to the DRCCC and the Detroit RAP group (U.S.) for use in the public consultation process which took place during January to March 2001. Based on public input, the document is anticipated to be finalized in 2001.

8.1.3 Detroit River Update Report, DRCCC, 1999. In Spring of 2000, the DRCCC released a Detroit River Update Report, which summarizes the progress of Canadian efforts since 1996. The report is intended to inform the public about progress in clean up efforts, identify problems causing environmental degradation of the River, and prioritize actions to restore its ecological integrity. The report can found at http://webnotes1.uwindsor.ca:8888/units/glier/Detroit_River_Project/DetroitRiver.nsf or by contacting the DRCCC directly.

8.1.4 Four-Agency Letter of Commitment, 1998. The Four Agencies responsible for development and implementation of the RAP (U.S. EPA, EC, MDEQ, and OMOE) signed a letter of commitment for the three binational AOCs (St. Mary's River, St. Clair River, and Detroit River) in April of 1998. The Letter specifies the roles and

responsibilities of the Four Agencies in implementing recommendations of the RAPs. The letter led to the development of several position papers that described how the agencies would cooperate internally on RAP activities within these AOCs (Appendix C).

Since the signing of the letter, the Four Agencies have collaborated on modeling efforts, sediment studies, State of the River Tours, data collection, and the development of a binational Geographic Information Systems (GIS) framework for storing binational AOC data. The Four Agencies have also developed a series of formal position papers which list general roles and responsibilities, including administrative commitments, development of a binational de-listing process listed above, public involvement and outreach, and reporting progress to the IJC and the public.

8.1.5 *International Joint Commission Area of Concern Evaluation, 1997.* In November 1997, the IJC issued their final report on the progress of the Detroit River AOC, the first in a series of AOC reviews that the Commission had committed to undertake. The IJC Detroit River AOC report was compiled after a series of interviews with RAP stakeholders and Agency representatives. It recognized the progress that had been achieved within the Detroit River AOC, but made reference to the Clean Sites Report and encouraged the Four Agencies to make a stronger effort to draw in and actively involve more stakeholders.

8.1.6 *Clean Sites Report, 1997.* Approximately ninety local stakeholders were involved in the production of the 1996 RAP Report. The Report took five years to complete. In late 1996, U.S. EPA contracted with Clean Sites (now called the Delta Institute) to conduct interviews with past and present BPAC members to determine how the BPAC and communication efforts could be improved. Clean Sites published their final report in April 1997.

8.2. Local Organizational Efforts

8.2.1 *Detroit River Canadian Cleanup Committee.* The Canadian Cleanup Committee and implementation framework was created as a result of a series of local stakeholders workshops and meetings sponsored by EC and the OMOE in early 1998. The community-based partnership of industry, government, academic, environmental, and community organizations came together to work collectively to restore the Detroit River. In meeting the spirit of the Canada-U.S. GLWQA, the purpose of the Committee is to cleanup, enhance, and sustain the ecosystem of the Detroit River and its tributary watersheds. The Committee relies on six Subcommittees to implement projects that will lead to the environmental restoration of the River - these Subcommittees include Point Source Pollution, NPS Pollution, Contaminated Sediments, CSO, Habitat, and Public Involvement and Communication. Roles and responsibilities of the DRCCC include:

- coordinating Canadian cleanup and enhancement activities;
- promoting cleanup action;
- promoting partnerships;
- developing multi-year plans and budgets that are project and program driven;
- reporting regularly on progress to the community and agencies;
- establishing criteria and time lines to measure progress.

An overview of the many achievements of the Public Involvement and Communications Committee of the DRCCC since its inception includes the following:

- a display has been developed which has been shown around the watershed at festivals and other gathering places. e.g., Windsor Public Library, Devonshire Mall;
- project signage has gone up at many locations around the watershed recognizing the many environmental improvement projects that have been undertaken as part of the initiative;
- a DRCCC banner has been produced for use at Riverwalk and other events; two newsletters have been produced and a third is being developed; and, a Public Forum was held in April 2000, which was well attended and included productive break out sessions and priority setting (DRCCC, 2000).

There is a recognized need to communicate better and work more cooperatively on binational issues such as monitoring, progress reporting, and public involvement and outreach. The DRCCC is leading the development of binational delisting (restoration) criteria; a binational kick-off meeting was held in Windsor on July 27, 2000.

8.2.2 Public Meetings, Michigan, 1998. In order to address the concerns regarding public involvement, U.S. EPA and MDEQ cosponsored several public meetings in January 1998 across the metro Detroit area to gather public input on how public outreach could be improved. A series of RAP restructuring plans were presented. Volunteers from these meetings were tasked with determining what sections of the Detroit stakeholder base were not represented in the process, and setting up additional meetings to get a wider range of comments on how to improve the RAP infrastructure.

8.2.3 Stakeholder Workshops, 1998. With the assistance of the first ad-hoc group and an independent local contractor, U.S. EPA and MDEQ put out a series of notices, conducted radio interviews, and mailed approximately two thousand invitations to a group of Detroit area stakeholders. The two Agencies led a series of stakeholder workshops in September and October 1998 to gather input on redesigning the RAP structure to maximize public involvement and accelerate remediation of the Detroit River AOC. The audience was unable to reach consensus on a future direction by the end of the sessions, so a team of volunteers from this meeting was incorporated into a

second ad-hoc group to design and implement a new structure for the implementation stage of the RAP.

8.2.4 Structure Development, 1999. Over the course of the next several months, U.S. EPA and MDEQ worked with the second ad-hoc group to develop and finalize a structure. The structure focused on grouping participants by River problems and solutions rather than by areas of technical expertise, to encourage more activity and direct involvement in the cleanup process. The second ad-hoc group approved the structure, which was then put into place at a kick-off meeting in September 1999. Since the formation of the new Detroit River RAP structure, chairs of the seven teams have been working to set team priorities and start projects to revitalize the Detroit River (see structure, Appendix D).

**Education and Outreach Summary of
Progress/Status**

- Creation of the DRCCC, 1998
- Creation of the US Detroit River RAP Teams, 1999
- DRCCC 1999 Detroit River Update Report and Summit, April 2000
- Joint Delisting Effort, 2000
- Presentation on the Detroit River and Huron/Erie Corridor at the State of the Great Lakes Ecosystem Conference, 2000
- State of the Strait Conference, 2001

CHAPTER 9

Schedule and Implementation Outlook

9.1. RAP Milestones

March 2001	State of the Strait
Jan.- March 2001	Public Consultation on Delisting
January 2001	Joint US/Canadian Steering Committee Meeting on Delisting
July 2000	Kick Off of Delisting Development
March 2000	Release of Detroit River Update Report from the DRCCC
February 2000	Four Party Compendium of Papers Finalized (Appendix F)
1999	US Implementation Committee Begins
1998	DRCCC Begins
1998	Four Agency Letter of Commitment Signed
1997	Monguagon Creek Sediment Remediation
1996	RAP Report (Use Impairments and Recommendations) Forwarded to IJC
1992	Stage 1 RAP Forwarded to IJC

9.2 Project Schedule of RAP Recommendations

(Many of these projects address more than one BUI. For ease of reporting they are listed under the primary BUI that they address.)

9.2.1 Degradation of Fish or Wildlife Populations

- Detroit River Sturgeon Project - Ongoing since 2000

9.2.2 Degradation of Benthos

- PCB Reduction and Minimization Project for the Detroit River - Initiated, 2001
- ECRA Rural Non-Point Source Pollution Remediation Program - Ongoing since 1996

9.2.3 Restrictions on Dredging Activities

- Black Lagoon Sediment Remediation - Ongoing since 1997

9.2.4 Restrictions on Drinking Water Consumption, or Taste and Odor Problems

- Wayne Count Illicit Connection Program for Ecorse Creek - Proposed, 2001

9.2.5 Degradation of Aesthetics

- City of Trenton Linked Riverfront Parks - Ongoing since 1999
- Initiate a pollution prevention program for marinas along the Detroit River - Ongoing since 2000
- Windsor Riverfront Pollution Control Planning Study - Ongoing since 1994
- Detroit DWSD Wastewater Master Plan, CSO Plan - Ongoing since 1997

9.2.6 Loss of Fish and Wildlife Habitat

- Essex Region Biodiversity Conservation Strategy - Ongoing since 1998
- The Atlas of Biodiversity of Southeast Michigan Watersheds: The Lake Huron to Lake Erie Corridor - Ongoing since 2001
- Detroit River Candidate Sites for Habitat Protection and Restoration - Ongoing since 1999
- USACE 206 Study for Hennipen Marsh - Completed 2000
- USACE 206 Study for Black Lagoon - Completed 2000

9.2.7 Exceedances of Water Quality Standards/Objectives

- Data Management and Modeling Framework for the Detroit River - Ongoing since 2000
- Implementation of Watershed Plans Regarding Non-point Sources for the Detroit River - Proposed 2001
- Promote pollution prevention outreach and goals within metal finishing sector - Ongoing

9.2.8 Degradation of Fish or Wildlife Populations

- Detroit River Ecological Risk Assessment - Proposed 1999, but unfunded

9.2.9 Degradation of Benthos

- Detroit River Bathymetry Study - Completed, 2000

9.2.10 Restrictions on Dredging

- USACE Reconnaissance Survey - Completed, 2000

9.2.11 Loss of Fish and Wildlife Habitat

- Detroit River GIS and Outreach Mapping Project - Proposed 2001, but unfunded

CHAPTER 10

Summary of Other Detroit River Related Activities

In addition to the RAP related activities described elsewhere in this document, U.S. and Canadian Federal, state, and provincial agencies, as well as local governmental and non-governmental entities, are undertaking projects that contribute to the restoring and preserving the environment. These activities are described below.

10.1 Delisting Criteria Development

In the position papers, the Four Agencies committed to coordinate a binational delisting process and coordinate and facilitate monitoring efforts to track progress toward delisting. The Four Agencies also agreed to oversee the peer review of the redesignation of beneficial uses and delisting of an AOC to ensure the process is credible and scientifically defensible.

Delisting criteria are benchmarks used to assess the progress toward restoration of use impairments. The Four Agency Working Group oversees the continuing development of delisting criteria and the setting of interim restoration targets. Once delisting criteria have been approved for an AOC, the Four Agency Working Group will periodically review and evaluate the validity and achievability of the delisting criteria through internal and external peer review. Development and review of delisting criteria will be done in consultation with the public and stakeholders.

The following principles are to be applied in the development and evaluation of these criteria:

1. Delisting criteria should be developed and periodically reviewed on a site-specific basis by the respective Federal, state, and provincial agencies, in conjunction with the public and stakeholders.
2. Delisting criteria should be premised on:
3. locally defined usage goals and related environmental objectives for the water body containing the AOC
4. applicable Federal, provincial, or state regulations, objectives, guidelines, standards, and policies
5. the principles and objectives embodied in Annex 2 and supporting parts of the GLWQA
6. Delisting criteria should be based on measurable indicators (e.g., numeric concentrations of a particular pollutant within the AOC), wherever possible.

7. Delisting of a particular impairment in an AOC can occur if it can be demonstrated that the impairment is not solely local geographic extent, but is typical of lake wide conditions. Such delisting would be contingent on evidence that sources within the AOC are controlled.

Delisting of a particular impairment can also occur when it is demonstrated that the impairment is due to natural rather than human causes (to be clarified with the IJC in the context of the GLWQA Annex 2 Review).

10.2 Downriver Linked Greenways Initiative

A consortium of eighteen Downriver communities, plus the City of Monroe, Wayne County, and the Huron-Clinton Metro Park have begun meeting regularly to devise a linked Greenways system. The trail system will use West Jefferson Avenue and Woodruff/South Huron River Drive to link the Downriver communities to the Detroit River and local recreational and cultural opportunities.

10.3 Downriver Area Brownfield Consortium

Comprised of the cities of Trenton, Riverview, Wyandotte, Monroe, Taylor, Romulus, and Dearborn, plus Grosse Ile Township and the Port of Monroe, these communities have banded together through a U.S. EPA pilot project grant to complete Phase 1 and 2 Baseline Environmental studies with the goal of cleaning up polluted industrial sites and making them useful again.

10.4 Downriver Waterfront Revitalization Task Force

A consortium of local communities, universities, and private industries to study Downriver issues. Issues explored this year include soft shoreline engineering, and a rain barrel demonstration project to collect stormwater.

10.5 American Heritage River Initiative

The Detroit River was designated an American Heritage River in 1998. The AHRI, announced by the President in his 1997 State of the Union address, offers special recognition to outstanding stretches of America's rivers by selecting them to be "American Heritage Rivers." Designated Rivers receive Federal assistance in the form of refocused programs, grants, and technical assistance from existing Federal resources. The purpose of the AHRI is to support community-based efforts to restore and protect the environmental, economic, cultural, and historic values of our Rivers.

10.6 Detroit River Candidate Site for Habitat Protection and Remediation

This project, recently funded by U.S. EPA through an Interagency Agreement with the USGS, will determine the number, location, and extent of remaining functional and impaired candidate sites of fish and wildlife habitats and summarize available information about the fish and wildlife resource values and function of each site. This is the starting point for balancing sustainable uses of the river for recreation, aesthetic enjoyment, and economic development. The results of the project will be applied in the execution of numerous riverfront remediation initiatives to increase public access, protect and enhance natural resources, and spur the economy of the City of Detroit and Downriver communities. This project will also complement a USGS Urban Dynamics project, which is concurrently being implemented from California.

10.7 Water Resource Development Act of 1999

Some critical language was included in this authority regarding the St. Clair/Detroit River corridor. Specifically, it provides funding and requires USACE and other governments of U.S. and Canada to develop a comprehensive management plan for the St. Clair River and Lake St. Clair to include identification of causes of environmental degradation, monitoring, and dissemination of information to the public. Regarding the Detroit River, there has been a change to the USACE's dredging authority, which provides for a greater share of dredging and the Federal government provide disposal costs.

10.8 Canadian Heritage River

On July 19, 2001, more than 500 people attended the dedication ceremony of the Detroit River as a Canadian Heritage River. Along with the U.S. designation in 1998, this designation makes the Detroit River the first international Heritage River.

The Detroit River was nominated to the CHRS in 1999 because of its outstanding human heritage and recreational values. The designation of the Detroit River and its watershed as a Canadian Heritage River will act as a catalyst for motivating governments, community organizations, businesses, and individuals alike to work together in developing strategic and sustainable directions and actions for conserving, interpreting, and appreciating the River's exceptional heritage values. As part of the process of designating the Detroit River as a Canadian Heritage River, a Management Strategy has been completed. (Source: The Detroit River Management Strategy Committee 2001: The Detroit River as a Canadian Heritage River. For the Canadian Heritage Rivers Board. 3rd Draft October 2000).

10.9 Lower River Vision

The conservation vision for the Lower Detroit River Ecosystem is intended to provide strategic direction for habitat conservation and preservation programs in the Lower Detroit River and support linkages with similar efforts in tributaries and their watersheds, and further binational coordination of efforts to conserve and protect natural resources in this internationally significant region. The conservation vision states, " in 10 years the Lower Detroit River Ecosystem will be an international conservation region where the health and diversity of wildlife and fish are sustained through protection of existing significant habitats and rehabilitation of degraded ones, and where the resulting ecological, recreational, economic, educational, and 'quality of life' benefits are sustained for present and future generations." This vision was lead by the Detroit American Heritage River Initiative and developed by representatives from many public, non-profit, and private organizations.

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APPENDIX A

Major Project Highlights for 1996 RAP Recommendations by BUI

SUMMARY OF DETROIT RIVER AOC BENEFICIAL USE IMPAIRMENTS, DELISTING GUIDELINES, RAP RECOMMENDATIONS, AND PROJECT STATUS

I. RESTRICTIONS ON FISH AND WILDLIFE CONSUMPTION ¹			
IJC "Delisting Guideline:" "When contaminant levels in fish and wildlife populations do not exceed current standards, objectives or guidelines, and no public health advisories are in effect for human consumption of fish or wildlife. Contaminant levels in fish and wildlife must not be due to contaminant input from the watershed." ¹	1996 RAP Update Report "Water Use Goals:" "Levels of contaminants such as PCBs and mercury in fish tissue shall be less than MDPH and OMNR/OMOE action levels." ² For Ontario the levels are 0.45 ppm of mercury, and 0.5 ppm for PCB; in Michigan the levels are 0.5 ppm for mercury and 0.05 ppm for PCB, ³ and 10 ppt dioxin.	1996 RAP Update Report Recommendations: N/A	Projects Ongoing or Proposed Relating to Recommendation: ⁴ N/A
II. TAINING OF FISH AND WILDLIFE FLAVOUR			
IJC "Delisting Guideline:" "When survey results confirm no tainting of fish or wildlife flavor."	1996 RAP Update Report "Water Use Goals:" "No tainting." No reports of tainting.	1996 RAP Update Report Recommendations - N/A	Projects Ongoing or Proposed Relating to Recommendation: N/A
III. DEGRADATION OF FISH AND WILDLIFE POPULATIONS			

¹Commission Approves List/Delist Criteria for Great Lakes Areas of Concern, Volume 16, Issue 1, ISSN 0832-6673 March/April 1991.

²Michigan Department of Environmental Quality. 1996. *1996 Detroit River Remedial Action Plan Report*. MDEQ, Lansing, MI. p. 14

³This is the most restrictive trigger level. Depending on the target population and amount of consumption, the trigger levels range from 2.0 ppm to 0.05 ppm PCB.

⁴See below for detailed description of projects

<p>IJC "Delisting Guideline:" "When environmental conditions support healthy, self-sustaining communities of desired fish and wildlife at predetermined levels of abundance that would be expected from the amount and quality of suitable physical, chemical and biological habitat present. An effort must be made to ensure that fish and wildlife objectives for Areas of Concern are consistent with Great Lakes ecosystem objectives and Great Lakes Fishery Commission fish community goals. Further, in the absence of community structure data, this use will be considered restored when fish and wildlife bioassays confirm no significant toxicity from water column or sediment contaminants."</p>	<p><u>1996 RAP Update Report "Water Use Goals:"</u> "To maintain a healthy, diverse and self-sustaining fish and wildlife community."</p>	<p><u>1996 RAP Update Report Recommendations -</u></p> <ul style="list-style-type: none"> - Direct federal funding to support specific activities required by the Great Lakes Fish and Wildlife Restoration Act in the AOC (#5)⁵ - Provide more effective protection to the migratory birds and their habitat. The Migratory Birds Convention Act should be Amended to include protection of nesting habitat throughout the year (#7) - Amend the Planning Act so that it will function more effectively in protecting fish and wildlife habitat and encourage more widespread proactive municipal planning on an ecosystem basis (#8) - Judge the status of fish populations in the Detroit River - (#25) 	<p><u>Projects Ongoing or Proposed Relating to Recommendation:</u> - (#25) <i>Detroit River Sturgeon Project:</i> A comprehensive rehabilitation plan for Detroit River lake Sturgeon (ongoing).</p>
<p>IV. FISH TUMORS AND OTHER DEFORMITIES</p>			
<p>IJC "Delisting Guideline:" "When the incidence rates of fish tumors or other deformities do not exceed rates at unimpacted control sites and when survey data confirm the absence of neoplastic or preneoplastic liver tumors in bullheads or suckers."</p>	<p><u>1996 RAP Update Report "Water Use Goals:"</u> "Liver and oral/dermal tumors incidence rates shall be no greater than rates at unimpacted control sites. Survey data shall confirm the absence of neoplastic or preneoplastic liver tumors."</p>	<p><u>1996 RAP Update Report Recommendations:</u> - N/A</p>	<p><u>Projects Ongoing or Proposed Relating to Recommendation:</u> N/A</p>
<p>V. BIRD OR ANIMAL DEFORMITIES OR REPRODUCTION PROBLEMS</p>			
<p>IJC "Delisting Guideline:" "When the incidence rates of deformities (e.g. cross-bill syndrome) or reproductive problems (e.g. egg-shell thinning) in sentinel wildlife species do not exceed background levels in inland control populations."</p>	<p><u>1996 RAP Update Report "Water Use Goals:"</u> "Deformities and reproductive problems shall be no greater than rates at unimpacted sites."</p>	<p><u>1996 RAP Update Report Recommendations:</u> - N/A</p>	<p><u>Projects Ongoing or Proposed Relating to Recommendation:</u> N/A</p>
<p>VI. DEGRADATION OF BENTHOS</p>			

⁵(#) Corresponds with recommendation number in the 1996 RAP Update Report

<p>IJC "Delisting Guideline:" "When the benthic macroinvertebrate community structure does not significantly diverge from unimpacted control sites of comparable physical and chemical characteristics. Further, in the absence of community structure data, this use will be considered restored when toxicity of sediment-associated contaminants is not significantly higher than controls."</p>	<p>1996 RAP Update Report "Water Use Goals:" "Establish and maintain benthic communities such that populations are diverse and appropriate for the physical characteristics of the area and include pollution tolerant organisms."</p>	<p>1996 RAP Update Report Recommendation:</p> <ul style="list-style-type: none"> - A program for the elimination of PCBs currently in use (electrical transformers and capacitors for example) should be actively pursued (#38) - Create a strong soil erosion control program to reduce the amount of erosion and sedimentation. Construction sites should be considered as priority in such a program (#63) - Implement a remedial plan, as outlined in ERCA's proposal for the reduction of soil erosion from agriculture lands (soil erosion and sediment control assistance programs, subject to funding availability) (#64) 	<p>Projects Ongoing or Proposed Relating to Recommendation:</p> <ul style="list-style-type: none"> - (#38) Expand PCB minimization program (proposed). - (#64) Remediation is continuing to address rural non-point source pollution entering the Detroit River watersheds of Canard River, Turkey Creek, and Little River (ongoing)
<p>VII. RESTRICTIONS ON DREDGING ACTIVITIES</p>			
<p>IJC "Delisting Guideline:" "When contaminants in sediments do not exceed standards, criteria, or guidelines such that there are restrictions on dredging or disposal activities."</p>	<p>1996 RAP Update Report "Water Use Goals:" "Concentration of pollutants in sediments shall be below levels that restrict dredging activities." <i>Discussion</i> - Restriction on dredging means "Sediments contaminant levels of all parameters shall be below the most restrictive value (basin wide/jurisdictional - likely to be protective of sediment dwelling organisms, cognizant of historical background conditions (pre-ambrosia, pre-colonial))."⁶</p>	<p>1996 RAP Update Report Recommendations:</p> <ul style="list-style-type: none"> - Recommend remedial action on a list of "hot spots" based on mercury levels (#29) 	<p>Projects Ongoing or Proposed Relating to Recommendation:</p> <ul style="list-style-type: none"> - (#29) Black Lagoon Sediment Remediation
<p>VIII. EUTROPHICATION OR UNDESIRABLE ALGAE</p>			
<p>IJC "Delisting Guideline:" "When there are no persistent water quality problems (e.g. dissolved oxygen depletion of bottom waters, nuisance algal blooms or accumulation decreased water clarity, etc.) attributed to cultural eutrophication."</p>	<p>1996 RAP Update Report "Water Use Goals:" "Nutrients from the river shall not impair uses downstream (nutrient loadings shall be consistent with the GLWQA)."</p>	<p>1996 RAP Update Report Recommendations:</p> <ul style="list-style-type: none"> - Implement a remedial plan for faulty private sewage disposal systems as outlined in ERCA's full proposal (i.e.: grant assistance program to update septic systems where communal sewage treatment systems are not feasible) (#61) - Determine the magnitude of faulty septic systems impacting rural watercourses to determine annual loading rates for tributary watersheds of the Detroit river (i.e.: land use/building inventory to further extrapolate the big creek data) (#62) - Educate and promote sound management practices through conservation farm management plans (#65) 	<p>Projects Ongoing or Proposed Relating to Recommendation: N/A</p>
<p>IX. RESTRICTION ON DRINKING WATER CONSUMPTION, OR TASTE AND ODOR PROBLEMS</p>			

⁶1996 Detroit River RAP Report

<p><u>IJC "Delisting Guideline:</u> "For treated drinking water supplies: 1) when densities of disease-causing organisms or concentrations of hazardous or toxic chemicals or radioactive substances do not exceed human health objectives, standards or guidelines; 2) when taste and odor problems are absent; and 3) when treatment needed to make raw water suitable for drinking does not exceed the standard treatment used in comparable portions of the Great Lakes which are not degraded (i.e. settling, coagulation, disinfection)."</p>	<p><u>1996 RAP Update Report "Water Use Goals:</u> "There shall be no taste or odor problems."</p>	<p><u>1996 RAP Update Report Recommendations:</u> Develop an illegal connections elimination program to identify and remove illegal connections to the stormwater system. These programs have had a high degree to success in other areas (#68)</p>	<p><u>Projects Ongoing or Proposed Relating to Recommendation:</u> - (#68) Expand Wayne County Illicit Connection Program to Ecorse Creek. (proposed).</p>
<p>X. BEACH CLOSINGS</p>			
<p><u>IJC "Delisting Guideline:</u> "When waters, which are commonly used for total-body contact or partial body-contact recreation, do not exceed standards, objectives, or guidelines for such use."</p>	<p><u>1996 RAP Update Report "Water Use Goals:</u> "All AOC areas shall be safe for total body contact activities. Bacteria levels shall meet OMOE/MDEQ criteria. There shall be no beach closings in the AOC or impacted areas in Lake Erie due to AOC contamination."</p>	<p><u>1996 RAP Update Report Recommendations:</u> - N/A</p>	<p><u>Projects Ongoing or Proposed Relating to Recommendation:</u> N/A</p>
<p>XI. DEGRADATION OF AESTHETICS</p>			

<p>IJC "Delisting Guideline." "When the waters are devoid of any substance which produces a persistent objectionable deposit, unnatural color or turbidity, or unnatural odor (e.g. oil slick, surface scum)."</p>	<p>1996 RAP Update Report "Water Use Goals." "Elimination of the discharges from CSOs and spills from point sources and non-point sources such that debris and persistent objectionable deposits are not found in the River or along the shoreline. There shall be no visible oil sheens on the river from any discharge."</p>	<p>1996 RAP Update Report Recommendations:</p> <ul style="list-style-type: none"> - Shorelines be protected and that public access to the Detroit River be increased to provide the public with more wildlife-oriented recreation and environmental education opportunities (#24) - Encourage the continuation of the Contaminated Sediments Technical Work Group (#26) - Begin an intensive education effort aimed at pleasure craft and marina owners on how to avoid discharges of pollution to the river (#75) - Larger fines for spills from industrial facilities (#76) - Implement MI CSO permitting strategy through effective NPDES permit application and enforcement (#84) - Adopt and implement the proposed Ontario Policy for CSO Control (#86) - Identify the CSOs with greatest impact on the Detroit River (loadings of contaminants of concern or adversely affecting Beneficial Uses including sediments) and develop and implement appropriate remedial programs to control those CSOs as described in A.6 (#87) - Complete implementation of short term CSO all PS controls by no later than 2000. Short term CSO are actions or measures that (1) can reduce CSO discharges and their effects on receiving water quality, (2) do not require significant engineering studies or major construction, and (3) can be implemented in a relatively short time (less than two Years). At a minimum, short term CSO controls should consist of (#88) - Complete development of long term plans by 1997 and implementation of final long term CSO controls no later than 2035. Long term programs should establish milestone schedules for accomplishing complete control by no later than 2035 which demonstrates steady and continuous progress. The programs should also describe periodic reporting to demonstrate the progress (#89) - Remove settleable solids and control all floatable sanitary waste from CSO discharges to ensure that downstream deposition and discharges of identifiable objects of human origin is minimized (#92) - Provide preferential treatment for separate sanitary flow and regulate combined sewer flows (#93) - The industrial pretreatment program and municipal sewer use by-law should be expanded to require indirect industrial dischargers that are tributary to CSOs to minimize their discharges during wet weather, where feasible (#96) - Complete the development of regional hydraulic models to demonstrate appropriate CSO controls (#104) 	<p>Projects Ongoing or Proposed Relating to Recommendation:</p> <ul style="list-style-type: none"> - (#24) City of Trenton Linked Riverfront Parks (ongoing). - (#75) - Initiate a pollution prevention program for marinas along the Detroit River (ongoing). - (#87) Windsor Riverfront Pollution Control Planning Study provides an implementation strategy for CSO control and reducing pollutant loadings to meet RAP objectives (ongoing). - (#87 - 89) Detroit DWSD Wastewater Master Plan, CSO Plan (ongoing), \$184 million in Windsor CSO control and an upgrade to secondary treatment at the WWTP (ongoing).
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XII. ADDED COSTS TO AGRICULTURE OR INDUSTRY			
IJC "Delisting Guideline:" "When there are no additional costs required to treat the water prior to use for agricultural purposes (i.e. including, but not limited to, livestock watering, irrigation and crop-spraying) and industrial purposes (i.e. intended for commercial or industrial applications and noncontact food processing)."	1996 RAP Update Report "Water Use Goals:" "There shall be no added costs to agriculture or industry for water improvement."	1996 RAP Update Report Recommendations: - N/A	Projects Ongoing or Proposed Relating to Recommendation: N/A
XIII. DEGRADATION OF PHYTOPLANKTON AND ZOOPLANKTON POPULATIONS			
IJC "Delisting Guideline:" "When phytoplankton and zooplankton community structure does not significantly diverge from unimpacted control sites of comparable physical and chemical characteristics. Further, in the absence of community structure data, this use will be considered restored when phytoplankton and zooplankton bioassays confirm no significant toxicity in ambient waters. "	1996 RAP Update Report "Water Use Goals:" "Assessment of nearshore populations of zooplankton shall indicate communities similar to those found in unimpacted control sites."	1996 RAP Update Report Recommendations: - N/A	Projects Ongoing or Proposed Relating to Recommendation: N/A
XIV. LOSS OF FISH AND WILDLIFE HABITAT			
IJC "Delisting Guideline:" "When the amount and quality of physical, chemical, and biological habitat required to meet fish and wildlife management goals have been achieved and protected."	1996 RAP Update Report "Water Use Goals:" "Wetlands shall be maintained at zero loss in the AOC, and no net loss of the productive capacity of fish habitats. Remediation, amelioration and restoration of wetlands shall be conducted whenever feasible. Management plans for fish and wildlife should be developed, and subsequently evaluated to determine if the current level of habitat supports the management plans' goals. Additional evaluation is necessary to determine the effects of water and sediment quality on biota."	1996 RAP Update Report Recommendations: <ul style="list-style-type: none"> - Develop habitat inventory for the AOC (#1) - Develop a habitat mgt. plan for the AOC (#2) - Develop GIS system for the St. Clair-Def. River corridor to ID various habitat types (#3) - Use of settlement and judgement awards to restore and protect habitat in the AOC (#4) - Develop specific provincial legislation with associated policy and adequate penalties to protect wetland area and function (#9) - The Conservation Authorities Act needs to be amended to give direct mandate to Conservation Authorities for the preservation and protection of wetlands, fish habitat and other environmentally significant areas. Also, the penalty provisions for violations, including the forcing of rehabilitation, should be substantially increased and strengthened to act as a greater deterrent (#10) - Encourage the development of a common wetland evaluation system for use in both Michigan and Ontario (#15) - Improve communication among the public, local governments and developers with MDNR and OMNR to preserve and protect existing habitat in the AOC (#16) 	Projects Ongoing or Proposed Relating to Recommendation: <ul style="list-style-type: none"> - (#1) Detroit River Candidate Sites for Habitat Protection and Restoration. 1999 - 2000 (draft complete), the Atlas of Biodiversity of Southeast Michigan Watersheds: The Lake Huron to Lake Erie Corridor (ongoing). - (#1 -2) Essex Region Biodiversity Conservation Strategy (ongoing). - (#20) US Army Corps 206 Study for Hennipen Marsh (completed), US Army Corps 206 Study for Black Lagoon (completed).

		<p>Establish an education program in the AOC to train local planning and zoning officials, real estate agents, consultants, developers; municipal building officials, and conservation officers in identifying permitting requirements, wetland violations, and habitat enhancement/protection opportunities (#18)</p> <ul style="list-style-type: none"> - Encourage participation in existing federal, state and provincial incentive programs for habitat protection and rehabilitation activities in the AOC (#20) - Reinstate the applicability of the Ontario Conservation Land Tax Rebate to Conservation Authority lands in order to protect these holdings located within the various AOC's (#21) - Begin remedial actions on the list of 19 proposed candidate sites for habitat restoration: Ontario Sites - <p>Peché Island Provincial Park, Windsor Waterfront, Ambassador Bridge, Black Oak Woods, Windsor Salt, Detroit River Wetland, Fighting Island, Grass Island, Turkey Island, Canard River Marshes, Canard River access, Crystal Bay Island, Bois Blanc Island, the Livingstone Channel trainer. <i>Michigan Sites</i> - Belle Isle, Celeron Island, Grassy Island In The Wyandotte Natl. Wildlife Refuge, Humbug Bar, Navigation Channel Dikes (#23)</p> <ul style="list-style-type: none"> - Expand data acquisition to accurately define total loadings from tributaries to the Detroit River specifically including sampling to reflect storm events (#73) 	
XV. EXCEEDANCE OF WATER QUALITY STANDARDS/OBJECTIVES			

<p>IJC "Delisting Guideline:" N/A</p>	<p>1996 RAP Update Report "Water Use Goals:" "Ambient water quality will not exceed current water quality standards or objectives." Water quality standards are: total PCBs 0.00002 ug/l; mercury 0.0006 ug/l; zinc 30 ug/l; copper 5 ug/l; cadmium 0.2 ug/l; lead 2.88 ug/l.⁷</p>	<p>1996 RAP Update Report Recommendations:</p> <ul style="list-style-type: none"> - Require MDNR & local government review of all county stream improvement projects in the Detroit River watershed (#6) - Support an increased level of sediment monitoring (#27) - Support an increased level of monitoring of sources in support of sediment modeling (#28) - Formation of a monitoring and modeling groups to oversee the collection of data and the evaluation of available models and model output for the AOC (#31) - Continue data acquisition and evaluation on all point sources dischargers for the parameters of concern at acceptable frequency and detection level to accurately define the total loading from each individual point source as well as total load (#32) - Set up a river monitoring program which will determine the local impacts of discharges as well as the total loading to the river (#33) - Institute rigorous industrial pretreatment and source elimination programs to reduce the parameters of concern to the lowest practical level (#34) - Further investigative work should be conducted on the Rouge and Ecorse Rivers to determine the sources of cadmium loadings in these tributaries to the Detroit River (#35) - Further investigative work should be conducted on the Rouge and Ecorse Rivers to determine where the high loadings are originating (Copper) (#36) 	<p>Projects Ongoing or Proposed Relating to Recommendation:</p> <ul style="list-style-type: none"> - (#28,32,33) Data Management and modeling framework for the Detroit River - a initiative which: Describes the current environmental health of the river; document significant changes of contaminant inputs over time; quantify Canadian contaminants loadings; and, determine the location and extent of Canadian contaminated sediments (on-going). - (#40) Non-point source investigation and quantification for the Detroit River (proposed). <p>Implementation of Watershed Plans Regarding Nonpoint Sources for the Detroit River (Consistent with RAP Recommendation #40)</p> <p>Project Type: Assessment/Research</p> <p>Project Goal: To implement four of the key recommendations pertaining to the control of nonpoint source pollution to the Detroit River.</p> <p>Project Status: Proposed 2001</p> <p>Narrative: Set-up a network of water sampling stations in the Detroit River to implement four of the non-point source recommendations from the 1996 RAP. Towards this, water samples will be collected from the stations to determine</p>
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⁷Ibid., p. 159 - 167

		<ul style="list-style-type: none"> - A quantitative evaluation of nontraditional sources is necessary to accurately qualify and quantify source loadings for the expressed purpose of control and elimination (PCBs) (#37) - A minimization plan for PCBs in the Detroit waste water system will be developed and implemented (#39) - A quantitative evaluation of nonpoint and nontraditional point sources is necessary to accurately quantify and qualify source loadings of mercury for the purpose of control and elimination (#40) - A minimization plan for mercury in the Detroit waste water system will be developed and implemented (#41) - New, long term planning programs are needed. a pollution prevention program needs to be established or continued as necessary to help keep substances out of the waste stream to begin with. New funding mechanisms are needed. stronger authority to local governments to levy fines for programs under their direct jurisdiction is necessary (concerning point source dischargers) (#44) - Institute a toxic chemical source elimination or reduction program (#54) - A clearly defined strategy for enforcing compliance in local PP programs should be developed. The current process of allowing each community to develop its own compliance and enforcement strategy creates inconsistent and ineffective strategies. The US EPA has established this for the Michigan side of the AOC by way of the requirements for enforcement response plans. This guidance was developed in 1989 (concerning point source discharges) (#57) - Control documents and discharge permits should consider both concentration and loading limitations of pollutants and included when applicable (#58) 	
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		<ul style="list-style-type: none"> - In order to properly implement the stormwater program and obtain sound data on which to make decisions about stormwater discharges from industrial sites monitoring should initially occur at a frequency determined to provide statistically accurate representations of the stormwater. This data should be used to make specific, long term monitoring recommendations (#69) - Monitor water quality on a watershed basis to show the effect of remedial measures (#60) - Monitor, on a sub-watershed basis the effects of remedial actions on improving water quality (#66) - Further investigative work should be done within the tributary watersheds of the Detroit River to determine loading rates of various pollutants associated with sediment runoff from agricultural lands (i.e: establish a monitoring program to determine the loading rates of various contaminants such as pesticides and fertilizers)(#67) - Develop a strong stormwater regulatory program. A strong program would set requirements for the quality of runoff from urban or urbanizing areas such as construction sites, large developed areas and industrial sites. To be effective requirements must be based on principles of watershed management (#69) - The loadings contributed by stormwater which are listed in the Stage I RAP are based on average urban stormwater quality and predicted runoff. Some site specific monitoring is needed to confirm or adjust the loadings so that decisions can be based on sound data. The monitoring should also evaluate control measures as they are installed (#70) - Methods should be evaluated to reduce the quantity of stormwater into the collection system of developed areas through retention and detention. Reducing the quantity of stormwater helps to maintain the Pre Development hydrologic balance, removes pollutants in the retention/detention practices and causes CSOs to discharge less frequently. To be practical and cost efficient the time frame for implementing such a plan could be 15 to 40 years (#71) - Continue to catalog all existing and abandoned landfills and remediation sites or any other identified groundwater contamination problems (#79) - Identify zones of local impact where possible (#81) - Implement pollution prevention programs, particularly with respect to reduction or elimination of discharge of the contaminants of concern to municipal sewers (#86) 	
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		<ul style="list-style-type: none"> - Meet the Michigan Water Quality Standards and Ontario Water Use Criteria for toxicity due to CSOs (#90) - Provide Adequate disinfection Of CSOs For Protection Of Human Health (#91) - Develop and implement a source control program for mercury and PCBs (#100) - Continue to gather data to quantify and qualify pollutant levels (particularly to toxics) in CSOs and pollutant loadings from CSOs to the Detroit River (#103) 	
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APPENDIX B

Detailed Update of Projects Relating to 1996 Recommendations and BULs

Degradation of fish or wildlife populations

Detroit River Sturgeon Project (Consistent with RAP Recommendation #25)(also in Lake Erie Management Plan Appendix D)

Project Type: Assessment/research, inventory

Project Goal: A comprehensive rehabilitation plan for Detroit River lake Sturgeon.

Project Status: Ongoing since 2000

Narrative: Because lake sturgeon live long and are bottom feeders, they are a potential indicator species for monitoring tissue

contaminant levels and dish habitat. The Detroit River and sediments are heavily contaminated and fish habitat is impaired. Little is

known about remnant Detroit River lake sturgeon populations. Understanding lake sturgeon population dynamics, habitat requirements at

all life stages, as well as the dynamics between sturgeon and contaminants will provide the basis for a comprehensive plan to rehabilitate

lake sturgeon populations. If the lake sturgeon and its habitat can be rehabilitated, the resulting benefit to Detroit River fisheries in

general will be a targeted approach to eliminating beneficial use impairments to fish and wildlife habitat.

Project Actions:

- Gather lake sturgeon spawning, nursing, feeding, resting and migration information in the Detroit River in order to determine

habitat needs.

- Evaluate the physical, chemical, and biological aspects of current or potential lake sturgeon habitat in the Detroit River.

- Research how exposure to contaminated sediments affects sturgeon growth and survival.

- Formulate a restoration plan for lake sturgeon in collaboration with regional fishery management authorities.

Project Partners: USGS/Biological Resources Division, US Fish and Wildlife Service, Great Lakes Fishery Commission, Michigan

Department of Natural Resources, Ontario Ministry of Natural Resources.

Degradation of Benthos

PCB Reduction and Minimization Project for the Detroit River (Consistent with RAP Recommendation #38)(also in Lake Erie

Management Plan Appendix F)

Project Type: Planning/coordination/collaboration, education/outreach

Project Goal: Pollution Prevention and Reduction of PCBs

Project Status: Proposed 2001

Narrative: Outreach activities will focus on involving small and medium sized industries in PCB reduction activities. Two educational

sessions will be held to inform attendees on current requirements and regulations concerning the use and disposal of PCBs. The

sessions will be followed by two Technology Transfer sessions designed to showcase successful PCB strategies applicable to small and

medium sized industries. Opportunities for formation of partnerships to lower costs related to PCB management through an economy

of scale would also be facilitated. The final portion of this proposal would offer no, or low cost facility inspections by trained and

Project Actions:

- Clarification of current PCB regulations and requirements for the Industrial Sector

- PCB fact sheet

- Two educational sessions on PCB regulations and requirements

- Two technology transfer sessions/partnering workshops

- Evaluation of possible PCB reduction actions at 5-15 medium to small industrial facilities

Project Partners: City of Detroit, US Detroit River RAP P2 team, US Detroit River RAP Non point source team, National Steel Great

Lakes Division, Michigan Department of Environmental Quality.

ECRA Rural Non-Point Source Pollution Remediation Program (Consistent with RAP Recommendation #64)(also in Lake Erie

Management Plan Appendix D)

Project Type: Planning/coordination/collaboration, education/outreach

Project Goal: Pollution Prevention and Reduction of Soil Erosion Effects on the Detroit River

Project Status: Ongoing since 1996

Narrative: Soil erosion and rural stormwater runoff a large problem in Ontario because 68% of the Ontario side of the Detroit River

remains primarily agricultural.

Project Actions:

- 30% reduction in on-till farming, resulting in 55% of the AOC involved in no-till farming practices

- 131 separate other erosion control projects have been undertaken including: tree planting, installation of buffer strips, rock

shoots, and septic upgrades

- Development of a GIS based model to predict soil erosion prone areas in the AOC

Project Partners: Essex Regional Conservation Authority, Environment Canada, local authorities, farming community.

Restrictions on Dredging Activities

Black Lagoon Sediment Remediation (Consistent with RAP Recommendation #29)

Project Type: New tool/technology demonstration, restoration.

Project Goal: To remove the contaminated sediments down to clean clay river bottom and implement suitable bank habitat restoration.

Disposal using alternative treatment technologies in detoxifying the sediments.

Project Status: Ongoing since 1997

Narrative: The Black Lagoon is located along the Trenton Channel of the Detroit River in the City of Trenton, MI. Sediment in the lagoon is contaminated with oil, grease and heavy metals, including high levels of mercury C qualifying it as a high priority for sediment remediation. Together, the U.S. Environmental Protection Agency's Great Lakes National Program Office and Michigan's Clean Michigan Initiative have allocated about \$1 million for removing and disposing of 30,000 cubic yards of contaminated sediments. The scheduled sediment remediation presents a unique opportunity for habitat restoration. In addition, \$8 million have been allocated for demonstrating an alternative technology for sediment remediation. Under the Greater Detroit AHR Initiative, the City of Trenton, the U.S. Army Corps of Engineers, and other Federal, State, and local agencies are exploring options for restoring the lagoon's riverbank and near shore aquatic habitat. A preliminary restoration plan was completed in 2000.

Project Actions:

- Isolate the area with the use of silt barriers
- Mechanically dredge approximately 30,000 yards of sediment.
- Employ alternative treatment method for reuse
- Employ conventional disposal options

Project Partners: MDEQ, US Army Corps of Engineers, USEPA, City of Trenton.

Restrictions on Drinking Water Consumption, or Taste and Odor Problems

Wayne County Illicit Connection Program for Ecorse Creek (Consistent with RAP Recommendation #68)

Project Type: Inventory, enforcement

Project Goal: Expand Wayne County Department of Environment illicit connections program to Ecorse Creek, a direct tributary to the Detroit River.

Project Status: Proposed, 2001

Narrative: Since 1987, Wayne County has operated an active illicit corrections program in the Rouge River Watershed. Funding sources limit activities to the Rouge River Watershed. Areas are selected for investigation based on water quality data, land use, complaint history, personal knowledge, return to designated use, to name a few. Once an area is selected, a dye test will be performed at the commercial and industrial facilities in that area. The facilities where violations are found, will be required to correct them. Wayne County works very closely with the communities on correcting the violations.

Project Actions:

- To actively look for, and find and eliminate illicit sewer connections.

Project Partners: MDEQ, Wayne County DOE, Detroit River RAP P2 Team, local municipalities.

Degradation of Aesthetics

City of Trenton Linked Riverfront Parks Consistent with RAP Recommendation #24(also in Lake Erie Management Plan Appendix D)

Project Type: Restoration, education/outreach

Project Goal: A rehabilitated and enhanced Detroit River shoreline and habitat for fish and wildlife in the City of Trenton, Michigan and increased public access that links a Riverfront park system.

Project Status: Ongoing since 1999

Narrative: Currently, much of the Detroit River shoreline is hardened or has been developed by municipalities and industry, causing significant loss of fish and wildlife habitat. This project will enhance fish and aquatic habitat along the Detroit River as part of a city and park redevelopment project in Trenton, Michigan. Rather than limiting riverbank stabilization to conventional sheet piling, gravel and cobble habitat will be designed and installed to demonstrate the feasibility of creating fish habitat in conjunction with urban park development. This habitat demonstration project is an important aspect of the larger, long-range City of Trenton Linked Riverfront Parks Master Plan. It is an action item that directly seeks to remediate the loss of fish and wildlife habitat and beneficial use impairment identified in the RAP.

Project Actions:

- Compile a summary report of baseline data on the existing aquatic habitat conditions in the Trenton Channel within the proposed project area.
- Design and install appropriate habitat at identified project sites.
- Disseminate information about the project widely.

Project Partners: City of Trenton, Downtown Development Authority, Michigan Department of Environmental Quality, Michigan Sea Grant, USGS, Greater Detroit American Heritage Rivers, US EPA, Wayne State University.

Initiate a pollution prevention program for marinas along the Detroit River (Consistent with RAP Recommendation #75)

Project Type: Planning/coordination/collaboration, education/outreach.

Project Goal: To improve water quality and reduce the presence of contaminated sediments from recreational boating and boating industry activities through waste reduction and pollution prevention.

Project Status: Ongoing since 2000

Narrative: Marinas have an important responsibility in protecting shore and surface water environments. Marinas are faced with challenging environmental problems such as: adverse environmental impacts which can result from pollutants generated by marina operations such as boat maintenance and repair.

Project Actions:

- Encourage marinas to make use of matching grants for installing of pumpout systems.
- Promote recycling at marinas
- Encourage marina owners to preclude in-water boat/hull repairs.
- Encourage marina owners to remove aquatic plants as opposed to using chemicals.

Project Partners: MDEQ, volunteer marinas, Detroit Yacht Club, Michigan Boating Industries Association.

Windsor Riverfront Pollution Control Planning Study (Consistent with RAP Recommendation #87)

Project Type: Protection

Project Goal: To develop a pollution control strategy for the Windsor Riverfront area as a component of an overall Pollution Control Plan for the City of Windsor

Project Status: Ongoing since 1994

Narrative: In many areas of the City, the combined sewers have insufficient capacity to carry storm water. The Windsor Riverfront Pollution Control Planning Study assessed conditions in the Detroit River Watershed and provide recommendations on preferred alternatives to correct pollution problems. The findings of the study formed part of the overall PCP for the City and provided information for use in development of the Detroit River RAP. The City of Windsor has now adopted the MOE guidelines for CSO control. The specific target of the guidelines is that 90% of the wet weather flow from the combined sewer system is to receive at least primary level treatment.

Project Actions:

- Identify all point of wastewater discharge the Detroit River
- Carry out sampling and flow monitoring activities to determine the quantity and quality of the wastewater being discharged under dry and wet weather conditions and estimate the impact of pollutant loads on the river

Project Partners: City of Windsor, Ministry of the Environment

Detroit DWSD Wastewater Master Plan, CSO Plan (Consistent with RAP Recommendation #87-89)

Project Type: Protection

Project Goal: A nine year program to reduce CSOs from outfalls along the River

Project Status: Ongoing since 1997

Narrative: Detroit's long term CSO Control Plan includes four major strategies to reduce overflows: rain water control; in-system storage; plant expansion; and, end-of-pipe treatment. Rain water control methods limit and control the amount of rain water that enters the sewer system. They City is conducting a two-year test program in four neighborhoods to determine how effective the rain water control methods are. These methods involved disconnecting down spouts so rain water drains into lawns instead of the sewer; using catch basin covers with sewer holes to slow down the rain going into the sewer; storing rain water in pipes under the street, planting trees and grass to absorb the rain water; and, demolishing abandoned buildings and planting grass on the lots. In-system storage involves storing waste water in existing sewer pipes during storms. In addition to these two methods, the DWSD will be expanding their in-plant treatment capacity by an additional 0.5 billion gallons/day. This means when the construction is completed the plant will be able to treat 1.7 billion gallons of wastewater per day. End-of-pipe treatments involve extensive construction. Basins treat and store combined sewage when it rains. After the rain storm, the basin sends the stored combined sewage back into the sewer where it goes to the wastewater treatment plant for treatment. Tunnels store combined sewage and provide some treatment. Like basins, tunnels release the combined sewage back into the sewer pipe. Other CSO treatment facilities disinfect the combined sewage and remove sanitary trash before the combined sewage enters the River.

Along the Detroit River there are three CSO projects currently underway on the U.S. side. A 30 million gallon retention basin is in the design phase at Conners Creek. At St. Aubin/Chene and Lieb/Harbertown outfalls screen and disinfection facilities are under construction.

Project Actions:

- the City is conducting a rain water test program in four neighborhoods to determine how effective these methods are in reducing the amount of rain water that gets into the system.
- the City is acquiring land to build end-of-pipe treatment
- the wastewater treatment plant expansion is due to begin in 2000.
- In-system storage and end-of-pipe treatment systems are expected to be installed beginning in 2001.

Project Partners: MDEQ

Loss of Fish and Wildlife Habitat

Essex Region Biodiversity Conservation Strategy (Consistent with RAP Recommendation #1, 2)(also in Lake Erie Management Plan Appendix D)

Project Type: Restoration

Project Goal: To identify high priority habitat restoration sites for the Essex region, and develop and implement restoration plans for these sites.

Project Status: Ongoing since 1998

Narrative: Through remote sensing and field surveys, remaining fish and wildlife habitats have been identified and mapped for parts of the Essex regions's Lake Erie watershed, including along the Detroit River, unmapped areas are presently being mapped. Using known ecological principles, high priority restoration and enhancement opportunities are identified. These opportunities, when implemented, will confer an immediate and significant benefit to the Biodiversity and ecosystem health of the local landscape. Once high priority sites are identified, landowner agreements are obtained, restoration plans are developed, and implementation is undertaken.

Project Actions:

- Determine the location and extent of remaining fish and wildlife habitats.
- Identify high priority fish and wildlife habitat enhancement opportunities.
- Provide associated recommendations regarding relative priority of habitat types for restoration, habitat targets, etc.

Project Partners: Essex Region Conservation Authority, Environment Canada, Canada Trust, Friends of the Environment Foundation, Essex County Stewardship Network, Ontario Ministry of Natural Resources, Ontario Ministry of Environment, Ducks Unlimited Canada, University of Windsor, Essex County Field naturalists Club, Citizens Environment Alliance, CAW Windsor Regional Environmental Council, Essex County Federation of Agriculture, Essex County Woodlot Owners Association, Little River Enhancement Group, Project Green, Canadian Wildlife Service, Carolinian Canada, County of Essex, City of Windsor, Town of LaSalle, Town of Amherstburg.

The Atlas of Biodiversity of Southeast Michigan Watersheds: The Lake Huron to Lake Erie Corridor (Consistent with RAP Recommendation #1)(also in Lake Erie Management Plan Appendix D)

Project Type: Inventory, assessment/research, education/outreach

Project Goal: To demonstrate the local and global significance of the Biodiversity of the Lake Huron/Erie Corridor. Promote broad based understanding of the significance of the region's Biodiversity.

Project Status: Ongoing since 2001

Narrative: The Atlas will be a compendium of information about the ecology and geology of the watersheds of the St. Clair River, Lake St. Clair and the Detroit River. The atlas will explain the geology of the area, and delve into the various plant communities, including wetlands, prairies, woodlands and riparian and upland zones. It will describe pre-settlement vegetation, give examples of those remnant plant communities still existing, and outline steps we can take to protect and restore the resource for the future. It will highlight how these areas serve as important habitat for wildlife, and describe how they are an essential convergence point for hundreds of thousands of waterfowl during their migration along both the Atlantic and Mississippi flyways.

Project Actions:

- Identify, survey, describe, and map existing vegetative features along the Huron/Erie corridor and Lake St. Clair.
- Describe the geology of the watersheds.
- Describe presettlement vegetative conditions, and identify remnants of these communities.
- Highlight and explain the importance of this region as a major migration flyway.
- Produce an Atlas which will be widely distributed to the public.

Project Partners: Wildlife Habitat Council, DTE Energy, USEPA, MDNR, Michigan Natural Features Inventory, Greater Detroit American Heritage River Initiative, St. Clair River RAP, Clinton River RAP, Lampton Stewardship Network, City of Detroit, Great Lakes Commission, Environment Canada, Ontario Ministry of Environment, Essex Region Conservation Authority.

Detroit River Candidate Sites for Habitat Protection and Restoration (Consistent with RAP Recommendation #2)(also in Lake Erie Management Plan Appendix D)

Project Type: Inventory, assessment/research

Project Goal: To inventory and describe the physical characteristics of remaining habitat for fish and wildlife in the Detroit River.

Project Status: Ongoing since 1999

Narrative: Through field surveys and low-altitude aerial photography, remaining habitat for fish and wildlife in the Detroit River will be inventoried. Candidate sites will be placed into two categories: functional habitat to be protected from impairment, and impaired, non-functional, habitat to be restored and enhanced. Green areas not converted to other land uses will be located along the Riverfront in Michigan waters and further characterized and investigated using field surveys and conversations with local residents. All candidate sites will be ranked in order of priority. Recommendations for protection and existing restoration measures will be outlined.

Project Actions:

- Determine the number, location, and extent of remaining functional and impaired candidate sites of fish and wildlife habitat.
- Characterize their present fish and wildlife resource value and function.
- Evaluate the potential of each site for protection and remediation.
- Prioritize sites in functional and impaired categories for remediation using an existing ranking system.

Project Partners: USGS/Biological Resources Division, US Fish and Wildlife Service, Grosse Ile Nature and Land Conservancy, Ducks Unlimited, Grosse Ile Conservation Club, Trenton Sportman Club, Downriver Walleye Federation, Greater Detroit American Heritage River, Waterways for Wildlife Project.

US Army Corps 206 Study for Hennipen Marsh (Consistent with RAP Recommendation #20)

Project Type: Assessment, protection, restoration

Project Goal: Exploring means of restoring marsh habitat and coastal wetland functions.

Project Status: Completed 2000

Narrative: Hennepin Marsh is located on the northwest shore of Grosse Ile in the lower end of the Detroit River and is owned by the Grosse Ile Nature and Land Conservancy. Under the Greater Detroit AHR Initiative, Grosse Ile Township, the U.S. Army Corps of Engineers, and other federal, state, and local agencies are exploring means of restoring marsh habitat. A potential solution is to increase water flow through a portion of the marsh. This would restore coastal wetland habitat, which has declined in the Detroit River over the years. A preliminary restoration plan was completed in summer 2000.

Project Actions:

- Initiate initial Assessment
- Complete initial assessment (preparation of Preliminary Restoration Plan)
- Feasibility Phase after approval of Preliminary Restoration Plan.

Project Partners: Greater Detroit AHR Initiative, Grosse Ile Township, U.S. Army Corps of Engineers, U.S. Geological Survey's Great Lakes Science Center, Michigan Department of Natural Resources, U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency.

US Army Corps 206 Study for Black Lagoon (Consistent with RAP Recommendation #20)

Project Type: Assessment, protection, restoration

Project Goal: Exploring means of restoring marsh habitat and coastal wetland functions.

Project Status: Completed 2000

Narrative: The Black Lagoon is located along the Trenton Channel of the Detroit River in the City of Trenton, MI. Sediment in the lagoon is contaminated with oil, grease and heavy metals, including high levels of mercury C qualifying it as a high priority for sediment remediation. Together, the U.S. Environmental Protection Agency's Great Lakes National Program Office and Michigan's Clean Michigan Initiative have allocated about \$1 million for removing and disposing of 30,000 cubic yards of contaminated sediments. The scheduled sediment remediation presents a unique opportunity for habitat restoration. In addition, \$8 million have been allocated for demonstrating an alternative technology for sediment remediation. Under the Greater Detroit AHR Initiative, the City of Trenton, the U.S. Army Corps of Engineers, and other Federal, State, and local agencies are exploring options for restoring the lagoon's riverbank and near shore aquatic

habitat. A preliminary restoration plan was completed in spring 2000.

Project Actions:

- Initiate initial Assessment
- Complete initial assessment (preparation of Preliminary Restoration Plan)
- Feasibility Phase after approval of Preliminary Restoration Plan.

Project Partners: Greater Detroit American Heritage River, City of Trenton, U.S. Army Corps of Engineers, U.S. Geological Survey's Great Lakes Science Center, Michigan Department of Natural Resources, U.S. Fish and Wildlife Service, Michigan Department of Environmental Quality, U.S. Environmental Protection Agency, City of Detroit Belle Isle Nature Center and Zoo.

Exceedances of Water Quality Standards/Objectives

Data Management and Modeling Framework for the Detroit River (Consistent with RAP Recommendation #28, 32, 33)

Project Type: Assessment/Research, Protection, Restoration

Project Goal: Describe the current health of the Detroit River

Project Status: Ongoing since 2000

Narrative: The Data Management and modeling framework for the Detroit River is an initiative which: Describes the current environmental health of the river; document significant changes of contaminant inputs over time; quantify Canadian contaminants loadings; and, determine the location and extent of Canadian contaminated sediments.

Project Actions:

- Build a systematic inventory of available datasets
- Provide a platform for data exchange between the groups working on the Detroit River and prevent duplication of efforts

Project Partners: University of Windsor, Environment Canada, MOE, USEPA, MDEQ, NOAA, USGS, USACE.

Implementation of Watershed Plans Regarding Nonpoint Sources for the Detroit River (Consistent with RAP Recommendation #40)

Project Type: Assessment/Research

Project Goal: To implement four of the key recommendations pertaining to the control of nonpoint source pollution to the Detroit River.

Project Status: Proposed 2001

Narrative: Set-up a network of water sampling stations in the Detroit River to implement four of the non-point source recommendations from the 1996 RAP. Towards this, water samples will be collected from the stations to determine the loadings of six pollutants that are of concern to the Detroit River. The pollutants that will be investigated include Cu, Cd, Zn, Pb, Hg and PCBs. In addition, we will determine the concentrations of suspended particulate matter, dissolved organic carbon, dissolved oxygen, major cations and anions, nutrients, and pH. Since the fate of these pollutants in the Detroit River are closely tied to their geochemical distribution, we will determine the partitioning of the pollutants of concern between the colloidal, particulate, and suspended phases. In order to quantify the loadings of these pollutants, we also will determine the atmospheric loadings of these contaminants to the watersheds of the Detroit River.

Project Actions:

- Identify key non-point sources to the Detroit River
- determine the loadings of six pollutants
- Determine concentrations of conventional parameters from the non-point sources
- Quantify loadings from the key non-point sources.

Project Partners: Department of Environmental Quality, Environmental Protection Agency, Department of Natural Conservation, Wayne County Watershed Management Division, and other local agencies

Promote pollution prevention outreach and goals within metal finishing sector (Consistent with RAP Recommendation #86)

Project Type: Planning/coordination/collaboration, education/outreach.

Project Goal: The purpose of the Metal Finishing Pollution Prevention Initiative (MRFP2I) is to provide a conduit to bring together the metal finishing industry and its stakeholders to strategize on P2 approaches to reduce the use and generation of hazardous materials.

Project Status: Ongoing

Narrative: The MRFP2I is a voluntary initiative with Michigan metal finishing industry and municipalities throughout the State of Michigan. The MRFP2I is designed to improve coordination and strengthen the delivery of P2 services to Michigan's metal finishing industry. Building on the success of existing P2 programs the MRFP2I can help the metal finishing industry achieve the goals outlined in the national Strategic Goals Program.

Project Actions:

- Identify specific businesses to coordinate with.
- Assist MDEQ with Pollution prevention efforts for those businesses that may affect the waters of the Detroit River.

Project Partners: MDEQ, Michigan Manufacturing Technology Center, National Center for Manufacturing Sciences, Water Environmental Association.

Other Detroit RAP Projects Mentioned in the Lake Erie LaMP

Degradation of fish or wildlife populations:

Detroit River Ecological Risk Assessment (Consistent with RAP Recommendation #25)(also in Lake Erie Management Plan Appendix D)

Project Type: Assessment/research, inventory/classification, implementation

Project Goal: Perform an ecological risk assessment for the Detroit River.

Project Status: Proposed 1999

Narrative: The initial focus of this project would be to conduct an ecological risk assessment of the entire Detroit River. The risk assessment would be conducted to evaluate the environmental and human health impacts of pollutants in the River. The authorities that

normally trigger clean up actions are based on human health standards and are often well above what would be toxic to benthic communities. It there is no mechanism in place to address lower levels of contaminants in the sediments under traditional federal regulatory authorities, therefore, damage must be evaluated on a case by case basis by risk assessment. In order to move toward delisting of Degradation of Benthos as a use impairment, a risk assessment is necessary to evaluate and establish authority over impaired areas which are below existing regulatory levels. This project evaluates the river as a whole to understand the dynamics of the entire system and the associated problems.

Project Actions:

- Define type of ecosystem (major component of hydrologic cycle, breeding and rearing wildlife valuable to people, readily accessible and low cost water source for domestic and industrial use, recreational and aesthetics value).
- Evaluate effects of contaminants on ecosystem.
- Establish factors influencing the ecological effects of individual contaminants.

Project Partners: US EPA, Environment Canada, US Army Corps of Engineers, Great Lakes Institute for Environmental Research, USGS/Biological Resources Division, US Fish and Wildlife Service, Michigan Department of Natural Resources, Ontario Ministry of Natural Resources.

Degradation of Benthos:

Detroit River Bathymetry Study

Project Type: Assessment/research, planning/coordination/collaboration

Project Goal: Develop a hydraulic flow study which will utilize and enhance the existing preliminary flow models to identify sources of water to public supply intakes.

Project Status: Complete, 2000

Narrative: The bathymetry survey is one part of a two part model. During planning for the hydraulic flow model, which is being undertaken by MDEQ, USGS, USACE, and Detroit DWS, the issue of accurate bathymetry data arose. Accurate bathymetry is critical to the success of the flow model. The model was originally intended to be run with existing data, 1955 and 1965, but the research team anticipated problems with the dated information and felt that the final model based on such data would not be useful. The need arose to construct the hydraulic model "from the ground up," however, there was no plan or funding to undertake a bathymetric survey as part of the flow model research. When presented with the overall project in October 1999, NOAA agreed to aid in the bathymetry research and will be providing a survey crew for the project in the Spring 2000.

Project Actions:

- Survey the St. Clair/Detroit Rivers with approximately 1139 cross sections at 100-meter line spacing.
- Continue to solicit contributions from other agencies for the project.
- Conduct Parameter estimation analysis to quantify the reliability of flow simulation results.
- Prepare a report that will be disseminated to the public

Project Partners: USGS, NOAA, USEPA, MDEQ, U.S. Army Corps of Engineers, City of Detroit.

Restrictions on Dredging

US Army Corps Environmental Reconnaissance Survey

Project Type: Assessment/research

Project Goal: Define water resource problems and identify solutions. Decide if there is Federal interest in implementing solutions to ecosystem degradation, flooding, and other related water resource problems. Identify a local Sponsor.

Project Status: Completed 2000

Narrative: The Reconnaissance Study can investigate single project navigation, flood damage reduction, ecosystem restoration, shore bank protection, or water quality enhancement. The Final Report will be used as a basis for making a decision to proceed or not to proceed into the feasibility phase.

Project Actions:

- Data collection and review.
- Field reconnaissance/Plan formulation.
- Evaluation of alternatives.
- Prepare draft preliminary analysis.
- Prepare final analysis report

Project Partners: MDEQ, USEPA, USGS, US Fish and Wildlife

Loss of Fish and Wildlife Habitat

Urban Dynamics of land use change and shoreline development along the Detroit River (Consistent with RAP Recommendation #14)(also in Lake Erie Management Plan Appendix D)

Project Type: Assessment/research, classification, education

Project Goal: A study of the Detroit River region from a temporal and spatial perspective and a time scale of decades will measure such historic, landscape changes and predict the ecologic and natural resource impacts of changes proposed in master plans already approved by jurisdictions along the river.

Project Status: Ongoing

Narrative: Geographic analysis combines an understanding of the demographic, economic, social, and geographic history of a region with the quantitative assessment of the spatial patterns, trends and rates of land use change. While goals of the program emphasize present-day environmental issues and local concerns, the historical component is crucial to understand how the modern urban environment evolved. By combining the analysis of urban land use change with historical and geographic information an "urban biography" can be derived that integrates temporal layers of geographic information with the pace, patterns, and extent of the urbanization process. The resulting interpretation integrates factors that drive, enable, shape, constrain, and sustain specific land use practices and patterns, such as

urban sprawl.

Project Actions:

- Document rates of change in wetlands, farmlands, forests, and lake plain prairie resulting from transformation of the natural landscape into an urban environment in the Detroit-Windsor corridor.
- Assess losses of fish habitat over time caused by changes in the channels of the Detroit River, including increased water depth and cross-sectional area, as a result of numerous navigation projects that deepened the river, armored the shoreline, and altered shallow, gradually-sloping, littoral areas.
- Our third objective is to educate the public about the influences of human immigrations, water level fluctuations, intensity of international trade, drainage laws, ship building, industrialization, wetland protection by private and public agencies, and modern transportation on land use changes, landscape morphology, and shoreline development.

Project Partners: USGS, USFWS, US Army Corps of Engineers, USEPA, International Joint Commission, Southeast Michigan Council of Governments, Cities of Detroit and Windsor, Essex Region Conservation Authority, Ontario Ministry of Natural Resources, Canada Fisheries and Oceans, Michigan DNR, Ontario MNR, Central Michigan University, Grosse Ile Township, Greater Detroit American Heritage Rivers.

Detroit River GIS and Outreach Mapping Project (Consistent with RAP Recommendation #3)(also in Lake Erie Management Plan Appendix D)

Project Type: Inventory, assessment/research, education/outreach

Project Goal: To provide an easy, reliable and cost-effective mechanism to make accessible and distribute, a wide variety of data sets in a standardized geo-referenced environment to stakeholders to use, for spatial data analysis and thematic mapping purposes.

Project Status: Proposed 2001

Narrative: The Lake Huron/Lake Erie corridor is comprised of the St. Clair, Lake St. Clair and Detroit River. These two rivers are Areas of Concern (AOC) within the Great Lakes. In 1996, the third priority recommendation in the Detroit River RAP report, was to develop a geographic information system (GIS) for the St. Clair/Detroit River AOCs. It was recognized then, that timely access to accurate spatial data in a GIS is a key tool for efficient and cost-effective decision making when addressing environmental issues. Addressing the information needs of the RAP's with a comprehensive GIS, will greatly assist the environmental restoration goals of the Lake Erie Lamp. Along with addressing LaMP goals, a GIS with this areal extent could help address the environmental problems associated within Lake St. Clair and be instrumental in spills planning and with implementation of the binational Lake Huron/Erie corridor environmental monitoring strategy, currently being developed. This GIS would also be a key asset for mapping habitat locations identified in the Biodiversity projects being developed by the U.S. and Canada and be used culturally for mapping historic features as part of the Greater Detroit American Heritage Rivers. This project will assemble and disseminate available data sets on commercial, industrial, and environmental information, and on imagery, habitats, cultural, transportation, hydrologic and physical features. Our ultimate goal is to provide consistent spatial data layers covering the Lake Huron/Lake Erie corridor. A GIS developed with this scope will support Lake Huron/Lake Erie corridor environmental management and will provide a solid foundation for interagency spatial data sharing and collaboration across the binational region.

Project Actions:

- Develop and distribute a survey to U.S. and Canadian agencies responsible for AOC, Lake St. Clair remediation and habitat restoration efforts. The survey would evaluate data availability, cost of procurement, data needs and presentation standard required to assist stakeholders with Huron/Lake Erie corridor projects.
- Develop data processing and presentation protocols, based on survey.
- Process data and design customized mapping tools for standard mapping presentations.
- Distribute standardized data layers and mapping tools on CD-ROM media to stakeholder agencies.
- Disseminate information and mapping tools to the general public via the Internet from a Web site and server located at Eastern Michigan University-CEITA lab.

Project Partners: Eastern Michigan University, USEPA, USACE, MDEQ, NOAA, USGS, Great Lakes Commission, SEMCOG, University of Windsor-GLIER, Environment Canada, Ontario Ministry of Environment, Essex Region Conservation Authority

*The numbers in parentheses correspond with the 104 Recommendations from the 1996 RAP Update Report.

APPENDIX C

Detroit River Ambient Water Quality 1992-1998 for Head and Mouth Transects.

Station	Date	01042 Copper (µg/L)	01027 Cadmium (µg/L)	01051 Lead (µg/L)	01092 Zinc (µg/L)	71900 Mercury (µg/L)
820059	92-05-05	2	0.2K	1K	4K	0.2K
	92-07-07	2	0.2K	1K	4K	0.2K
	92-08-04	1	0.2K	1K	4K	0.2K
	92-09-01	1K	0.2K	1K	4K	0.2K
	92-10-06	2	0.2K	1K	4K	0.2K
	93-05-11	1	0.2K	1K	4K	0.2K
	93-07-13	1	0.2K	1K	5	0.2K
	93-08-10	1	0.2K	1K	7	0.2K
	93-09-01	1K	0.5	1K	4K	0.2K
	93-10-05	1K	0.2K	1K	4K	0.2K
	94-05-10	1K	0.2K	1K	4K	0.2K
	94-07-05	1K	0.2K	1K	5	0.2K
	94-08-02	1K	0.2K	1K	4K	0.2K
	94-09-06	1	0.2K	1K	4K	0.2K
	94-10-04	1K	0.2K	1K	4K	0.2K
	95-05-09	2	0.2K	1K	10	0.2K
	95-07-11	1K	0.2K	1K	4K	0.2K
	95-08-01	1K	0.2K	1K	4K	0.2K
	95-09-05	1K	0.2K	1K	4K	0.2K
	95-10-10	1K	0.2K	1K	4K	0.2K
	96-05-21	--	--	--	--	--
	97-06-11	--	--	--	--	--
	1998	--	--	--	--	--
820061	92-05-05	1	0.2K	1K	4K	0.2K
	92-07-07	1	0.2K	1K	4K	0.2K
	92-08-04	1K	0.2K	1K	4K	0.2K
	92-09-01	1	0.2K	1K	4K	0.2K
	92-10-06	1K	0.2K	1K	9	0.2K
	93-05-11	1	0.2K	1K	4K	0.2K
	93-07-13	1	0.2K	1K	4K	0.2K
	93-08-10	1K	0.2K	1K	18	0.2K

Station	Date	01042 Copper (µg/L)	01027 Cadmium (µg/L)	01051 Lead (µg/L)	01092 Zinc (µg/L)	71900 Mercury (µg/L)
	93-09-01	1K	0.2K	1K	4K	0.2K
	93-10-05	4	0.2K	1K	5	0.2K
	94-05-10	1K	0.2K	1K	4K	0.2K
	94-07-05	1K	0.2K	1K	4K	0.2K
	94-08-02	1K	0.2K	1K	4K	0.2K
	94-09-06	1K	0.2K	1K	4	0.2K
	94-10-04	1K	0.2K	1K	4K	0.2K
	95-05-09	1	0.2K	1K	4	0.2K
	95-07-11	1K	0.2K	1K	4K	0.2K
	95-08-01	1K	0.2K	1K	4K	0.2K
	95-09-05	1K	0.2K	1K	4K	0.2K
	95-10-10	1K	0.2K	1K	4K	0.2K
	96-05-21	--	--	--	--	--
	97-06-11	--	--	--	--	--
	97-08-13	--	--	--	--	--
	97-10-07	--	--	--	--	--
	1998	--	--	--	--	--
820414	92-05-05	1K	0.2K	1K	4K	0.2K
	92-07-07	2	0.2K	1K	4K	0.2K
	92-08-04	1	0.2K	1K	6	0.2K
	92-09-01	1	0.2K	1K	5	0.2K
	92-10-06	1	0.2K	1K	4K	0.2K
	93-05-11	2	0.2K	1K	4K	0.2K
	93-07-13	1	0.2K	1K	4K	0.2K
	93-08-10	1K	0.2K	1K	4K	0.2K
	93-09-01	1K	0.2K	1K	4K	0.2K
	93-10-05	1K	0.2K	1K	4K	0.2K
	94-05-10	1K	0.2K	1K	4K	0.2K
	94-07-05	1K	0.2K	1	7	0.2K
	94-08-02	1K	0.2K	1K	4K	0.2K
	94-09-06	1K	0.2K	1K	4K	0.2K
	94-10-04	1K	0.2K	1K	4K	0.2K
	95-05-09	1K	0.2K	1K	6	0.2K
	95-07-11	1K	0.2K	1K	8	0.2K
	95-08-01	1K	0.2K	1K	4K	0.2K

Station	Date	01042 Copper (µg/L)	01027 Cadmium (µg/L)	01051 Lead (µg/L)	01092 Zinc (µg/L)	71900 Mercury (µg/L)
	95-09-05	1K	0.2K	1K	8	0.2K
	95-10-10	1K	0.2K	1K	7	0.2K
	96-05-21	--	--	--	--	--
	97-06-11	--	--	--	--	--
	97-08-13	--	--	--	--	--
	97-10-07	--	--	--	--	--
	**98-06-16	0.641	0.0087	0.09	0.46	0.002
	**98-07-21	0.644	0.0087	0.188	0.708	0.003
	**98-09-02	0.572	0.011	0.166	0.45	0.002
	**98-10-07	0.878	0.008	0.394	1.324	0.006
	**98-11-03	1.605	0.026	1.299	4.029	0.02
000002	92-05-05	1	0.2K	1K	4K	0.2K
	92-07-07	1	0.2K	1K	4K	0.2K
	92-08-04	1	0.2K	1K	6	0.2K
	92-09-01	1	0.2K	1K	14	0.2K
	92-10-06	2	0.2K	1K	10	0.2K
	93-05-11	2	0.2K	1K	4K	0.2K
	93-07-13	2	0.2K	1K	4K	0.2K
	93-08-10	1K	0.2K	1K	15	0.2K
	93-09-01	1	0.2K	1K	4K	0.2K
	93-10-05	1K	0.2K	1K	5	0.2K
	94-05-10	1K	0.2K	1K	4K	0.2K
	94-07-05	1K	0.2K	1K	4K	0.2K
	94-08-02	1K	0.2K	1K	4K	0.2K
	94-09-06	1K	0.2K	1K	4K	0.2K
	94-10-04	1K	0.2K	1K	4K	0.2K
	95-05-09	2	0.2K	1K	7	0.2K
	95-07-11	1K	0.2K	1K	4K	0.2K
	95-08-01	1K	0.2K	1K	4K	0.2K
	95-09-05	1K	0.2K	1K	4	0.2K
	95-10-10	1K	0.2K	1K	4K	0.2K
	96-05-21	--	--	--	--	--
	97-06-11	--	--	--	--	--
	97-08-13	--	--	--	--	--
	97-10-07	--	--	--	--	--

Station	Date	01042 Copper (µg/L)	01027 Cadmium (µg/L)	01051 Lead (µg/L)	01092 Zinc (µg/L)	71900 Mercury (µg/L)
820011	92-05-05	2	0.2K	1	10	0.2K
	92-07-07	2	0.2K	1	8	0.2K
	92-08-04	2	0.2K	1	10	0.2K
	92-09-01	2	0.2	2	11	0.2K
	92-10-06	2	0.2K	1K	10	0.2K
	93-05-11	1	0.2	1K	10	0.2K
	93-07-13	2	0.2K	1K	10	0.2K
	93-08-10	3	0.4	3	29	0.2K
	93-09-01	2	0.2K	3	19	0.2K
	93-10-05	2	0.3	2	14	0.2K
	94-05-10	2	0.2K	1	10	0.2K
	94-07-05	4	0.2K	1	15	0.2K
	94-08-02	2	0.2K	2	12	0.2K
	94-09-06	2	0.2K	2	20	0.2K
	94-10-04	2	0.2K	1K	7	0.2K
	95-05-09	3	0.2K	1K	29	0.2K
	95-07-11	1	0.2K	1K	7	0.2K
	95-08-01	1	0.2K	1K	11	0.2K
	95-09-05	1K	0.2K	1K	6	0.2K
	95-10-10	1	0.2K	1K	6	0.2K
	96-05-21	--	--	--	--	--
	97-06-11	--	--	--	--	--
	97-08-13	--	--	--	--	--
	97-10-07	--	--	--	--	--
820014	92-05-05	1	0.2K	1K	4	0.2K
	92-05-05	1	0.2K	1K	4K	0.2K
	92-07-07	2	0.2K	1K	4K	0.2K
	92-07-07	2	0.2K	1K	4K	0.2K
	92-08-04	2	0.2	1	22	0.2K
	92-08-04	1	0.2K	1	5	0.2K
	92-09-01	1	0.2K	2	7	0.2K
	92-09-01	1	0.2K	1	6	0.2K
	92-10-06	1	0.2K	1K	5	0.2K
	92-10-06	1	0.2K	1K	6	0.2K
	93-05-11	2	0.2K	1K	4K	0.2K

Station	Date	01042 Copper (µg/L)	01027 Cadmium (µg/L)	01051 Lead (µg/L)	01092 Zinc (µg/L)	71900 Mercury (µg/L)
	93-05-11	2	0.2K	1K	8	0.2K
	93-07-13	2	0.2K	1K	4K	0.2K
	93-07-13	2	0.2K	1K	12	0.2K
	93-08-10	1	0.2K	2	9	0.2K
	93-08-10	1	0.2K	1K	7	0.2K
	93-09-01	1	0.2K	1	10	0.2K
	93-09-01	1	0.2K	2	7	0.2K
	93-10-05	1	0.2K	1K	7	0.2K
	93-10-05	1K	0.2K	1K	6	0.2K
	94-05-10	1	0.2K	1K	6	0.2K
	94-05-10	1K	0.2K	1K	4	0.2K
	94-07-05	2	0.2K	1K	14	0.2K
	94-07-05	1	0.2K	1K	6	0.2K
	94-08-02	1K	0.2K	1K	6	0.2K
	94-08-02	1	0.2K	1K	6	0.2K
	94-09-06	1	0.2K	1	7	0.2K
	94-09-06	1	0.2K	1	6	0.2K
	94-10-04	1	0.2K	1K	4	0.2K
	94-10-04	1	0.2K	1K	3	0.2K
	95-05-09	1	0.2K	1K	9	0.2K
	95-05-09	1	0.2K	1K	7	0.2K
	95-07-11	1K	0.2K	1K	5	0.2K
	95-07-11	1K	0.2K	1K	4	0.2K
	95-08-01	1	0.2K	1K	9	0.2K
	95-08-01	1	0.2K	1K	7	0.2K
	95-09-05	1K	0.2K	1K	6	0.2K
	95-09-05	1	0.2K	1K	6	0.2K
	95-10-10	1	0.2K	1K	8	0.2K
	95-10-10	1	0.2K	1K	7	0.2K
	96-05-21	--	--	--	--	--
	97-06-11	--	--	--	--	--
	97-08-13	--	--	--	--	--
	97-10-07	--	--	--	--	--

Station	Date	01042 Copper (µg/L)	01027 Cadmium (µg/L)	01051 Lead (µg/L)	01092 Zinc (µg/L)	71900 Mercury (µg/L)
820016	92-05-05	1	0.2K	1K	7	0.2K
	92-07-07	1	0.2K	1K	4K	0.2K
	92-08-04	1	0.2K	1K	5	0.2K
	92-09-01	1	0.2K	1	8	0.2K
	92-10-06	1	0.2K	1K	8	0.2K
	93-05-11	2	0.2K	1K	4K	0.2K
	93-07-13	2	0.2K	1K	4K	0.2K
	93-08-10	1	0.2K	1	7	0.2K
	93-09-01	1K	0.2K	1	4K	0.2K
	93-10-05	1K	0.2K	1K	4K	0.2K
	94-05-10	1K	0.2K	1K	6	0.2K
	94-07-05	1K	0.2K	1K	4	0.2K
	94-08-02	1K	0.2K	1K	4K	0.2K
	94-09-06	1K	0.2K	1K	5	0.2K
	94-10-04	1	0.2K	1K	5	0.2K
	95-05-09	1	0.2K	1K	7	0.2K
	95-07-11	1K	0.2K	1K	10	0.2K
	95-08-01	1K	0.2K	1K	4K	0.2K
	95-09-05	1K	0.2K	1K	6	0.2K
	95-10-10	1K	0.2K	1K	6	0.2K
820017	92-05-05	1	0.2K	1K	7	0.2K
	92-07-07	2	0.2K	1K	4K	0.2K
	92-09-01	1	0.2K	1	4K	0.2K
	92-10-06	1K	0.2K	1K	4K	0.2K
	93-05-11	1	0.2K	1K	4K	0.2K
	93-07-13	2	0.2K	1K	4K	0.2K
	93-08-10	2	0.2K	1K	6	0.2K
	93-09-01	1K	0.2K	1K	4K	0.2K
	93-10-05	1K	0.2K	1K	4K	0.2K
	94-05-10	1K	0.2K	1K	17	0.2K
	94-07-05	1K	0.2K	1K	4K	0.2K
	94-08-02	1K	0.2K	1K	5	0.2K
	94-09-06	1K	0.2K	1K	5	0.2K
	94-10-04	1K	0.2K	1K	4K	0.2K
	95-05-09	1K	0.2K	1K	4K	0.2K

Station	Date	01042 Copper (µg/L)	01027 Cadmium (µg/L)	01051 Lead (µg/L)	01092 Zinc (µg/L)	71900 Mercury (µg/L)
	95-07-11	1K	0.2K	1K	15	0.2K
	95-08-01	1K	0.2K	1K	4K	0.2K
	95-09-05	1K	0.2K	1K	10	0.2K
	95-10-10	1K	0.2K	1K	4K	0.2K
	96-05-21	--	--	--	--	--
	97-06-11	--	--	--	--	--
	97-08-13	--	--	--	--	--
	97-10-07	--	--	--	--	--
	**98-06-17	0.693	0.008	0.174	0.677	0.001
	**98-07-21	0.806	0.006	0.294	1.205	0.002
	**98-09-03	0.665	--	0.119	0.539	0.008
	**98-10-07	0.804	0.012	0.326	1.265	0.002
	**98-11-03	0.666	0.012	0.143	0.637	0.001
000024	92-05-05	1K	0.2K	1K	4K	0.2K
	92-07-07	2	0.2K	1K	4K	0.2K
	92-08-04	1K	0.2K	1K	6	0.2K
	92-09-01	1K	0.2K	1K	4K	0.2K
	92-10-06	1	0.2K	1K	4K	0.2K
	93-05-11	1	0.2K	1K	4K	0.2K
	93-07-13	2	0.2K	1K	4K	0.2K
	93-08-10	1K	0.2K	1K	4K	0.2K
	93-09-01	1K	0.2K	1K	4K	0.2K
	93-10-05	1	0.2K	1K	4K	0.2K
	94-05-10	1K	0.2K	1K	4K	0.2K
	94-07-05	1K	0.2K	1K	4K	0.2K
	94-08-02	1	0.2K	1K	7	0.2K
	94-09-06	1K	0.2K	1K	7	0.2K
	94-10-04	1K	0.2K	1K	4K	0.2K
	95-05-09	1K	0.2K	1K	10	0.2K
	95-07-11	1K	0.2K	1K	4K	0.2K
	95-08-01	1K	0.2K	1K	4K	0.2K
	95-09-05	1K	0.2K	1K	4	0.2K
	95-10-10	1K	0.2K	1K	4K	0.2K
000027	92-05-05	1K	0.2K	1K	4K	0.2K
	92-07-07	2	0.2K	1K	4K	0.2K

Station	Date	01042 Copper (µg/L)	01027 Cadmium (µg/L)	01051 Lead (µg/L)	01092 Zinc (µg/L)	71900 Mercury (µg/L)
	92-08-04	1	0.2K	1K	4K	0.2K
	92-09-01	1K	0.2K	1K	6	0.2K
	92-10-06	1	0.2K	1K	4	0.2K
	93-05-11	1	0.2K	1K	4K	0.2K
	93-07-13	1	0.2K	1K	4K	0.2K
	93-08-10	1K	0.2K	1K	8	0.2K
	93-09-01	1K	0.2K	1K	4K	0.2K
	93-10-05	1	0.2K	1K	6	0.2K
	94-05-10	1K	0.2K	1K	4K	0.2K
	94-07-05	1K	0.2K	1K	4K	0.2K
	94-08-02	1K	0.2K	1K	4K	0.2K
	94-09-06	1	0.2K	1K	6	0.2K
	94-10-04	1	0.2K	1K	4	0.2K
	95-05-09	1	0.2K	1K	8	0.2K
	95-07-11	1K	0.2K	1K	4K	0.2K
	95-08-01	1K	7	1K	4K	0.2K
	95-09-05	1K	0.2K	1K	6	0.2K
	95-10-10	1K	0.2K	1K	4K	0.2K
000029	92-05-05	1K	0.2K	1K	4K	0.2K
	92-07-07	2	0.2K	1K	4K	0.2K
	92-08-04	1	0.2K	1K	7	0.2K
	92-09-01	1	0.2K	1K	4K	0.2K
	92-10-06	2	0.2K	1K	8	0.2K
	93-05-11	2	0.2K	1K	4K	0.2K
	93-07-13	2	0.2K	1K	4K	0.2K
	93-08-10	2	0.2K	1	9	0.2K
	93-09-01	1K	0.2K	1K	5	0.2K
	93-10-05	1K	0.2K	1K	4K	0.2K
	94-05-10	1	0.2K	1K	5	0.2K
	94-07-05	1K	0.2K	1K	7	0.2K
	94-08-02	1K	0.2K	1K	4K	0.2K
	94-09-06	1	0.2K	1	5	0.2K
	94-10-04	1K	0.2K	1K	5	0.2K
	95-05-09	1	0.2K	1K	8	0.2K
	95-07-11	1K	0.2K	1K	8	0.2K

Station	Date	01042 Copper (µg/L)	01027 Cadmium (µg/L)	01051 Lead (µg/L)	01092 Zinc (µg/L)	71900 Mercury (µg/L)
	95-08-01	1K	0.2K	1K	4K	0.2K
	95-09-05	1K	0.2K	1K	5	0.2K
	95-10-10	1K	0.2K	1K	6	0.2K

Source: USEPA STORET Database (2000)

K= Actual value is less than the value given. Substance, if present, is below this limit.

** Data provided by MDEQ SWQD

Ambient Water Quality Statistics by Station Location

River Head Stations

Station:	• Number of Samples/ Conc. Avg.	Total Mean Value	Standard Deviation	Minimum Value	Maximum Value	Beginning and Ending Date
820059						
Copper ug/l	9 - 1.422 11 K - 1.000	1.190	0.290	1.000	2.000	92/05/05 - 95/10/10
Cadmium ug/l	1 - 0.500 19 K - 0.200	0.215	0.067	0.200	0.500	92/05/05 - 95/10/10
Lead ug/l	20 K - 1.000	1.000	0.000	1.000	1.000	92/05/05 - 95/10/10
Zinc ug/l	4 - 6.750 16 K - 4.000	4.550	1.468	4.000	10.000	92/05/05 - 95/10/10
Mercury ug/l	20 K - 0.200	0.200	0.000	0.200	0.200	92/05/05 - 95/10/10

Station:	• Number of Samples/ Conc. Avg.	Total Mean Value	Standard Deviation	Minimum Value	Maximum Value	Beginning and Ending Date
820061						
Copper ug/l	7 - 1.700 13 K - 1.000	1.245	0.754	1.000	4.000	92/05/05 - 95/10/10
Cadmium ug/l	20 K - 0.200	0.200	0.000	0.200	0.200	92/05/05 - 95/10/10
Lead ug/l	20 K	1.000	0.000	1.000	1.000	92/05/05 - 95/10/10
Zinc ug/l	5 - 7.920 15 K - 4.00	4.980	3.235	4.000	18.000	92/05/05 - 95/10/10
Mercury ug/l	20 K - 0.200	0.200	0.000	0.200	0.200	92/05/05 - 95/10/10

Station: 820414	* Number of Samples/ Conc. Avg.	Total Mean Value	Standard Deviation	Minimum Value	Maximum Value	Beginning and Ending Date
Copper ug/l	11 - 1.121 14 K - 1.000	1.053	0.228	1.000	2.000	92/05/05 - 98/11/03
Cadmium ug/l	5 - 0.012 20 K - 0.200	0.162	0.075	0.008	0.200	92/05/05 - 98/11/03
Lead ug/l	6 - 0.522 19 K - 1.000	0.780	0.401	0.090	1.299	92/05/05 - 98/11/03
Zinc ug/l	12 - 4.496 13 K - 4.000	4.238	1.997	0.450	8.000	92/05/05 - 98/11/03
Mercury ug/l	5 - 0.033 20 K - 0.200	0.161	1.78	0.002	0.200	92/05/05 - 98/11/03

Station: 000002	* Number of Samples/ Conc. Avg.	Total Mean Value	Standard Deviation	Minimum Value	Maximum Value	Beginning and Ending Date
Copper ug/l	9 - 1.577 11 K - 1.000	1.260	0.373	1.000	2.000	92/05/05 - 95/10/10
Cadmium ug/l	20 K - 0.200	0.200	0.000	0.200	0.200	92/05/05 - 95/10/10
Lead ug/l	20 K - 1.000	1.000	0.000	1.000	1.000	92/05/05 - 95/10/10
Zinc ug/l	7- 8.614 13 K - 4.000	5.615	3.355	0.400	15.000	92/05/05 - 95/10/10
Mercury ug/l	20 K - 0.200	0.200	0.000	0.2000	0.2000	92/05/05 - 95/10/10

River Mouth Stations

Station: 820011	* Number of Samples/ Conc. Avg.	Total Mean Value	Standard Deviation	Minimum Value	Maximum Value	Beginning and Ending Date
Copper ug/l	19 - 1.936 1 K - 1.000	1.890	0.610	1.000	4.000	92/05/05 - 95/10/10
Cadmium ug/l	4 - 0.275 16 K - 0.200	0.215	0.048	0.200	0.400	92/05/05 - 95/10/10
Lead ug/l	11 - 1.636 9 K - 1.000	1.350	0.525	1.000	3.000	92/05/05 - 95/10/10
Zinc ug/l	20 - 12.64	12.64	6.770	6.000	29.000	92/05/05 - 95/10/10
Mercury ug/l	20 K - 0.200	0.200	0.000	0.200	0.200	92/05/05 - 95/10/10

Station: 820014	* Number of Samples/ Conc. Avg.	Total Mean Value	Standard Deviation	Minimum Value	Maximum Value	Beginning and Ending Date
Copper ug/l	30 1.396 5 K - 1.000	1.340	0.286	1.000	2.000	92/05/05 - 95/10/10
Cadmium ug/l	1 - 0.200 34 K - 0.200	0.200	0.000	0.200	0.200	92/05/05 - 95/10/10
Lead ug/l	8 - 1.400 27 K - 1.000	1.091	0.224	1.000	2.000	92/05/05 - 95/10/10
Zinc ug/l	30 - 7.523 5 K - 4.000	7.020	3.480	4.000	22.000	92/05/05 - 95/10/10
Mercury ug/l	35 K - 0.200	0.200	0.000	0.200	0.200	92/05/05 - 95/10/10

Station: 820016	* Number of Samples/ Conc. Avg.	Total Mean Value	Standard Deviation	Minimum Value	Maximum Value	Beginning and Ending Date
Copper ug/l	10 - 1.34 10 K - 1.000	1.170	0.271	1.000	2.000	92/05/05 - 95/10/10
Cadmium ug/l	20 K - 0.200	0.200	0.000	0.200	0.200	92/05/05 - 95/10/10
Lead ug/l	3 - 1.33 17 K - 1.000	1.050	0.127	1.000	2.000	92/05/05 - 95/10/10
Zinc ug/l	13 - 6.469 7 K - 4.000	5.605	1.744	4.000	10.000	92/05/05 - 95/10/10
Mercury ug/l	20 K - 0.200	0.200	0.000	0.200	0.200	92/05/05 - 95/10/10

Station: 820017	* Number of Samples/ Conc. Avg.	Total Mean Value	Standard Deviation	Minimum Value	Maximum Value	Beginning and Ending Date
Copper ug/l	11 - 0.148 13 K - 1.000	1.068	0.324	0.666	2.000	92/05/05 - 98/11/03
Cadmium ug/l	4 - 0.009 19 K - 0.200	0.166	0.071	0.008	0.200	92/05/05 - 98/11/03
Lead ug/l	6 - 0.342 18 K - 1.000	0.835	0.322	0.143	1.000	92/05/05 - 98/11/03
Zinc ug/l	12 - 5.776 12 K - 4.000	4.888	3.935	0.539	17.000	92/05/05 - 98/11/03
Mercury ug/l	5 - 0.003 20 K - 0.200	0.160	1.78	0.001	0.200	92/05/05 - 98/11/03

Station: 000024	* Number of Samples/ Conc. Avg.	Total Mean Value	Standard Deviation	Minimum Value	Maximum Value	Beginning and Ending Date
Copper ug/l	6 - 1.400 14 K - 1.000	1.120	0.293	1.000	2.000	92/05/05 - 95/10/10
Cadmium ug/l	20 K - 0.200	0.200	0.000	0.200	0.200	92/05/05 - 95/10/10
Lead ug/l	20K - 1.000	1.000	0.000	1.000	1.000	92/05/05 - 95/10/10
Zinc ug/l	5 - 6.860 15 K - 4.000	4.715	1.607	4.000	10.000	92/05/05 - 95/10/10
Mercury ug/l	20 K - 0.200	0.200	0.000	0.200	0.200	92/05/05 - 95/10/10

Station: 000027	* Number of Samples/ Conc. Avg.	Total Mean Value	Standard Deviation	Minimum Value	Maximum Value	Beginning and Ending Date
Copper ug/l	9 - 1.200 11 K - 1.000	1.090	0.171	1.000	2.000	92/05/05 - 95/10/10
Cadmium ug/l	1 - 7.00 19 K - 0.200	0.540	1.520	0.200	7.00	92/05/05 - 95/10/10
Lead ug/l	20K - 1.000	1.000	0.000	1.000	1.000	92/05/05 - 95/10/10
Zinc ug/l	8 - 6.000 12 K - 4.000	4.800	1.336	4.000	8.000	92/05/05 - 95/10/10
Mercury ug/l	20 K - 0.200	0.200	0.000	0.200	0.200	92/05/05 - 95/10/10

Station: 000029	* Number of Samples/ Conc. Avg.	Total Mean Value	Standard Deviation	Minimum Value	Maximum Value	Beginning and Ending Date
Copper ug/l	10 - 1.400 10 K - 1.000	1.200	0.295	1.000	2.000	92/05/05 - 95/10/10
Cadmium ug/l	20 K - 0.200	0.200	0.000	0.200	0.200	92/05/05 - 95/10/10
Lead ug/l	2 - 1.400 18 K - 1.000	1.040	0.123	1.000	1.000	92/05/05 - 95/10/10
Zinc ug/l	12 - 6.50 8 K - 4.000	5.500	1.712	4.000	9.000	92/05/05 - 95/10/10
Mercury ug/l	20 K - 0.200	0.200	0.000	0.200	0.200	92/05/05 - 95/10/10

* See table above for individual sample results.

Source: USEPA STORET Database (2000)

K= Actual value is less than the value given. Substance, if present, is below this limit.

APPENDIX D

Estimated Gross Loadings from Permitted Discharges

Permit or CofA	Pipe	Facility Name	Flow MGD	Concentration µg/L	Months sampled	Loading Kg/Day
CADMIUM 1994 Category 1						
MI0022802	049F	Detroit WWTP	713.667	0.002	12	6.222
MI0043800	001A	Wayne County Huron Valley WWTP	6.586	0.009	9	0.217
MI0000540	001A	BASF - Wyandotte	2.440	0.000	2	0.002
MI0021164	001A	Trenton WWTP	5.027	0.000	3	0.000
CADMIUM 1995 Category 1						
MI0022802	049F	Detroit WWTP	686.000	0.001	10	3.456
MI0021164	001A	Trenton WWTP	5.053	0.005	4	0.100
MI0021156	001A	Wayne County - Wyandotte WWTP	63.470	0.000	3	0.049
MI0043800	001A	Wayne County Huron Valley WWTP	7.170	0.000	12	0.009
MI0000540	001A	BASF - Wyandotte	3.127	0.000	3	0.001
CADMIUM 1996 Category 1						
MI0022802	049F	Detroit WWTP	731.375	0.001	9	1.889
0000020107		FORD MOTOR CO. OF CANADA, LTD				0.157
MI0021156	001A	Wayne County - Wyandotte WWTP	61.783	0.000	4	0.066
MI0043800	001A	Wayne County Huron Valley WWTP	9.102	0.000	9	0.010
MI0021164	001A	Trenton WWTP	4.686	0.000	4	0.005
MI0000540	001A	BASF - Wyandotte	3.020	0.000	1	0.001
CADMIUM 1997 Category 1						
MI0038105	001A	Wyandotte Electric Plant & WFP	42.553	0.007	8	1.111
MI0022802	049F	Detroit WWTP	828.714	0.000	7	0.918
MI0038105	004A	Wyandotte Electric Plant & WFP	9.864	0.010	9	0.390

Permit or CofA	Pipe	Facility Name	Flow MGD	Concentration µg/L	Months sampled	Loading Kg/Day
MI0021156	001A	Wayne County - Wyandotte WWTP	62.060	0.000	4	0.104
MI0021164	001A	Trenton WWTP	4.513	0.000	4	0.002
CADMIUM 1998 Category 1						
MI0021156	001A	Wayne County - Wyandotte WWTP	67.293	0.010	4	2.608
MI0038105	001A	Wyandotte Electric Plant & WFP	42.192	0.003	12	0.538
MI0038105	004A	Wyandotte Electric Plant & WFP	9.038	0.013	12	0.444
MI0022802	050A	Detroit WWTP	4.750	0.001	4	0.018
MI0021164	001A	Trenton WWTP	4.964	0.000	4	0.004
MI0022802	049F	Detroit WWTP	759.250	0.000	8	0.000
COPPER 1994 Category 1						
MI0022802	049F	Detroit WWTP	713.667	0.043	12	117.532
MI0002399	001A	McLouth Steel - Trenton	18.550	0.024	10	1.704
MI0043800	001A	Wayne County Huron Valley WWTP	6.553	0.021	11	0.540
MI0026191	001A	Grosse Ile Township WWTP	1.968	0.012	11	0.093
MI0001791	00C3	Detroit Edison - Trenton Plant	1.958	0.000	9	0.000
MI0021164	001A	Trenton WWTP	4.750	0.000	4	0.000
COPPER 1995 Category 1						
MI0022802	049F	Detroit WWTP	686.000	0.068	12	181.647
MI0021156	001A	Wayne County - Wyandotte WWTP	56.906	0.033	7	7.214
MI0002399	001A	McLouth Steel - Trenton	17.109	0.016	11	1.049
MI0021164	001A	Trenton WWTP	5.053	0.028	4	0.538
MI0043800	001A	Wayne County Huron Valley WWTP	7.170	0.013	12	0.361
MI0026191	001A	Grosse Ile Township WWTP	1.983	0.001	11	0.006

Permit or CofA	Pipe	Facility Name	Flow MGD	Concentration µg/L	Months sampled	Loading Kg/Day
MI0001791	00C3	Detroit Edison - Trenton Plant	2.029	0.000	6	0.000
COPPER 1996 Category 1						
MI0022802	049F	Detroit WWTP	713.545	0.040	12	111.752
MI0021156	001A	Wayne County - Wyandotte WWTP	63.823	0.024	12	5.853
0000020107		FORD MOTOR CO. OF CANADA, LTD				2.188
MI0002399	001A	McLouth Steel - Trenton	6.463	0.017	12	0.415
MI0021164	001A	Trenton WWTP	4.686	0.023	4	0.409
MI0043800	001A	Wayne County Huron Valley WWTP	8.974	0.006	12	0.211
MI0002381	001A	ELF Atochem North America Inc	9.625	0.001	4	0.028
MI0001791	00C3	Detroit Edison - Trenton Plant	1.836	0.000	10	0.000
MI0026191	001A	Grosse Ile Township WWTP	2.243	0.000	3	0.000
COPPER 1997 Category 1						
MI0022802	049F	Detroit WWTP	798.000	0.035	12	109.002
MI0021156	001A	Wayne County - Wyandotte WWTP	67.318	0.035	12	9.060
MI0021164	001A	Trenton WWTP	4.513	0.014	4	0.245
MI0043800	001A	Wayne County Huron Valley WWTP	9.894	0.006	12	0.211
MI0002381	001A	ELF Atochem North America Inc	12.150	0.002	4	0.106
MI0002399	001A	McLouth Steel - Trenton	0.146	0.007	2	0.004
MI0001775	00E1	Detroit Edison - Conners Creek	0.015	0.000	2	0.000
MI0001791	00C3	Detroit Edison - Trenton Plant	2.160	0.000	12	0.000
COPPER 1998 Category 1						
MI0022802	049F	Detroit WWTP	759.250	0.023	8	66.197

Permit or CofA	Pipe	Facility Name	Flow MGD	Concentration µg/L	Months sampled	Loading Kg/Day
MI0021156	001A	Wayne County - Wyandotte WWTP	64.629	0.018	12	4.612
MI0022802	050A	Detroit WWTP	4.750	0.065	4	1.201
MI0043800	001A	Wayne County Huron Valley WWTP	10.976	0.009	7	0.365
MI0002381	001A	ELF Atochem North America Inc	12.800	0.003	3	0.165
MI0021164	001A	Trenton WWTP	4.386	0.002	6	0.028
MI0002399	001A	McLouth Steel - Trenton	0.108	0.008	4	0.003
MI0001791	003C	Detroit Edison - Trenton Plant	2.132	0.000	5	0.000
MI0001791	00C3	Detroit Edison - Trenton Plant	2.276	0.000	7	0.000
MERCURY 1994 Category 1						
MI0022802	049F	Detroit WWTP	705.000	0.000	2	0.273
MI0000540	001A	BASF - Wyandotte	2.373	0.000	3	0.000
MI0021164	001A	Trenton WWTP	4.725	0.000	11	0.000
MI0043800	001A	Wayne County Huron Valley WWTP	6.107	0.000	1	0.000
MERCURY 1995 Category 1						
MI0022802	049F	Detroit WWTP	702.000	0.000	2	0.272
MI0021164	001A	Trenton WWTP	4.648	0.000	12	0.000
MI0000540	001A	BASF - Wyandotte	2.865	0.000	4	0.000
MERCURY 1996 Category 1						
MI0022802	049F	Detroit WWTP	684.800	0.000	5	0.260
0000020107		FORD MOTOR CO. OF CANADA, LTD				0.003
MI0021164	001A	Trenton WWTP	4.802	0.000	12	0.001
MI0000540	001A	BASF - Wyandotte	2.920	0.000	4	0.000
MERCURY 1997 Category 1						
MI0021164	001A	Trenton WWTP	5.097	0.000	12	0.001
MI0000540	001A	BASF - Wyandotte	2.248	0.000	4	0.000

[illegible]

[illegible]

Permit or CofA	Pipe	Facility Name	Flow MGD	Concentration µg/L	Months sampled	Loading Kg/Day
MI0022802	049F	Detroit WWTP	675.167	0.005	6	11.773
MI0002399	001A	McLouth Steel - Trenton	17.225	0.042	12	2.787
MI0021156	001A	Wayne County - Wyandotte WWTP	63.470	0.002	3	0.574
MI0026786	008A	Nat'l Steel, Great Lakes Div.	27.032	0.002	12	0.261
MI0043800	001A	Wayne County Huron Valley WWTP	7.170	0.004	12	0.102
MI0000540	001A	BASF - Wyandotte	2.918	0.003	12	0.032
MI0004227	001A	McLouth Steel - Gibraltar	0.520	0.014	10	0.028
MI0021164	001A	Trenton WWTP	5.053	0.001	4	0.020
MI0002313	018A	Nat'l Steel, Great Lakes Div.	1.945	0.002	12	0.018
LEAD 1996 Category 1						
MI0022802	049F	Detroit WWTP	721.300	0.007	10	18.168
0000020107		FORD MOTOR CO. OF CANADA, LTD				7.608
MI0021156	001A	Wayne County - Wyandotte WWTP	61.783	0.006	4	1.377
MI0002399	001A	McLouth Steel - Trenton	4.395	0.027	10	0.462
MI0026786	008A	Nat'l Steel, Great Lakes Div.	31.757	0.002	12	0.241
MI0043800	001A	Wayne County Huron Valley WWTP	9.102	0.004	9	0.125
MI0000540	001A	BASF - Wyandotte	2.883	0.002	12	0.019
MI0002313	018B	Nat'l Steel, Great Lakes Div.	2.345	0.002	12	0.018
MI0002313	018A	Nat'l Steel, Great Lakes Div.	2.361	0.002	10	0.017
MI0004227	001A	McLouth Steel - Gibraltar	0.190	0.005	8	0.004
MI0021164	001A	Trenton WWTP	4.686	0.000	4	0.000
LEAD 1997 Category 1						
MI0022802	049F	Detroit WWTP	733.667	0.004	3	11.372
MI0021156	001A	Wayne County - Wyandotte WWTP	62.060	0.019	4	4.509

Permit or CofA	Pipe	Facility Name	Flow MGD	Concentration µg/L	Months sampled	Loading Kg/Day
MI0026786	008A	Nat'l Steel, Great Lakes Div.	32.818	0.005	12	0.621
MI0021164	001A	Trenton WWTP	4.513	0.006	4	0.096
MI0002313	018B	Nat'l Steel, Great Lakes Div.	2.379	0.002	12	0.022
MI0002399	001A	McLouth Steel - Trenton	0.158	0.028	4	0.017
MI0000540	001A	BASF - Wyandotte	2.344	0.001	11	0.013
MI0004227	001A	McLouth Steel - Gibraltar	0.236	0.006	6	0.006
LEAD 1998 Category 1						
MI0021156	001A	Wayne County - Wyandotte WWTP	71.183	0.015	3	4.193
MI0026786	008A	Nat'l Steel, Great Lakes Div.	32.427	0.007	12	0.888
MI0002313	018B	Nat'l Steel, Great Lakes Div.	1.385	0.003	12	0.013
MI0021164	001A	Trenton WWTP	4.964	0.001	4	0.011
MI0000540	001A	BASF - Wyandotte	2.107	0.001	11	0.009
MI0002313	018A	Nat'l Steel, Great Lakes Div.	1.670	0.001	1	0.006
MI0002313	033A	Nat'l Steel, Great Lakes Div.	1.670	0.001	1	0.006
MI0002399	001A	McLouth Steel - Trenton	0.093	0.005	4	0.002
ZINC 1994 Category 1						
MI0022802	049F	Detroit WWTP	713.667	0.056	12	154.405
MI0002399	001A	McLouth Steel - Trenton	17.800	0.941	11	64.918
MI0026786	008A	Nat'l Steel, Great Lakes Div.	33.209	0.026	8	3.378
MI0002381	001A	ELF Atochem North America Inc	7.817	0.030	12	0.904
MI0002313	014B	Nat'l Steel, Great Lakes Div.	4.229	0.050	9	0.819
MI0021164	001A	Trenton WWTP	4.750	0.043	4	0.782
MI0043800	001A	Wayne County Huron Valley WWTP	6.552	0.030	4	0.768
MI0004227	001A	McLouth Steel - Gibraltar	0.753	0.043	11	0.124

Permit or CofA	Pipe	Facility Name	Flow MGD	Concentration µg/L	Months sampled	Loading Kg/Day
ZINC 1995 Category 1						
MI0022802	049F	Detroit WWTP	686.000	0.043	12	112.976
MI0002399	001A	McLouth Steel - Trenton	17.225	0.410	12	27.350
MI0026786	008A	Nat'l Steel, Great Lakes Div.	27.055	0.030	8	3.145
MI0021164	001A	Trenton WWTP	5.053	0.048	4	0.930
MI0043800	001A	Wayne County Huron Valley WWTP	7.446	0.031	4	0.902
MI0002313	014B	Nat'l Steel, Great Lakes Div.	4.229	0.043	12	0.696
MI0002381	001A	ELF Atochem North America Inc	7.773	0.022	11	0.657
MI0004227	001A	McLouth Steel - Gibraltar	0.511	0.025	8	0.049
ZINC 1996 Category 1						
0000020107		FORD MOTOR CO. OF CANADA, LTD				111.850
MI0022802	049F	Detroit WWTP	704.917	0.038	12	104.710
MI0002399	001A	McLouth Steel - Trenton	6.463	0.123	12	3.084
MI0026786	008A	Nat'l Steel, Great Lakes Div.	31.735	0.020	10	2.459
MI0002313	014B	Nat'l Steel, Great Lakes Div.	4.229	0.063	12	1.024
MI0002381	001A	ELF Atochem North America Inc	9.970	0.026	10	0.993
MI0021164	001A	Trenton WWTP	4.686	0.038	4	0.681
MI0043800	001A	Wayne County Huron Valley WWTP	8.929	0.016	3	0.565
MI0004227	001A	McLouth Steel - Gibraltar	0.245	0.017	11	0.016
ZINC 1997 Category 1						
MI0022802	049F	Detroit WWTP	761.222	0.058	9	170.101
MI0026786	008A	Nat'l Steel, Great Lakes Div.	32.771	0.020	11	2.540
MI0002381	001A	ELF Atochem North America Inc	12.070	0.035	10	1.614

Permit or CofA	Pipe	Facility Name	Flow MGD	Concentration µg/L	Months sampled	Loading Kg/Day
MI0002313	014B	Nat'l Steel, Great Lakes Div.	4.117	0.041	12	0.661
MI0021164	001A	Trenton WWTP	4.513	0.025	4	0.433
MI0002399	001A	McLouth Steel - Trenton	0.146	0.036	6	0.020
MI0004227	001A	McLouth Steel - Gibraltar	0.236	0.016	6	0.015
ZINC 1998 Category 1						
MI0026786	008A	Nat'l Steel, Great Lakes Div.	32.427	0.025	12	3.099
MI0002381	001A	ELF Atochem North America Inc	11.610	0.020	10	0.918
MI0002313	014B	Nat'l Steel, Great Lakes Div.	4.100	0.038	10	0.605
MI0021164	001A	Trenton WWTP	4.964	0.023	4	0.447
MI0002399	001A	McLouth Steel - Trenton	0.108	0.024	5	0.010

Source: (for tables 21-26): Point Source values derived using PCS data sent via email by Allen Melcer and w007_96.XLS received via email in big zip file

APPENDIX E

US Federally Reported Spills From 1995 - 1999

1995

Report No.	Date	Location	Remarks
277258	23-Jan-95	Ecorse	750 gals of untreated blast furnace recycle water
277416	24-Jan-95	Detroit	tanker truck overflow of unknown oil
285017	30-Mar-95	Ecorse	groundwater seepage from diesel oil in storage tank
287347	17-Apr-95	Ecorse	unknown oil sheen from hot mill outfall
288769	26-Apr-95	Ecorse	unknown oil sheen leaking through seawall
290666	09-May-95	Detroit	unknown oil sheen flowing in sewer line
291981	18-May-95	Ecorse	hydraulic oil spill and leaking equipment
293288	28-May-95	Detroit	unknown oil sheen
293445	30-May-95	Taylor	hydraulic oil spill on Goddard Road
294658	08-Jun-95	Detroit	diesel oil spill on I-75
298616	06-Jul-95	Ecorse	unknown oil sheen at outfall
300306	18-Jul-95	Detroit	crude coke over tar leaking on barge
300916	21-Jul-95	Ecorse	blast furnace gas cleaning water sump pump failure
304374	18-Aug-95	Ecorse	unknown oil overflowed from treatment ponds
306630	06-Sep-95	Ecorse	unknown oil sheen
306770	08-Sep-95	Ecorse	unknown oil sheen
308209	21-Sep-95	Ecorse	hydraulic oil from hot mill complex
309386	02-Oct-95	Detroit	unknown bilge material release
310173	08-Oct-95	Ecorse	unknown oil sheen
310466	11-Oct-95	Ecorse	unknown oil seeping through containment boom
313849	11-Nov-95	Detroit	3 gal. Of fuel oil #6 discharge while transferring
313853	11-Nov-95	Detroit	2 gal. Of fuel oil #6 discharge from hose line
313864	11-Nov-95	River Rouge	unknown oil sheen at outfall
317300	15-Dec-95	Ecorse	unknown oil sheen
318372	28-Dec-95	Ecorse	2,600 gal. Of oil and misc. lubricating fluids leaking from faulty fixture

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1996

Report No.	Date	Location	Remarks
319014	04-Jan-96	Ecorse	diesel oil overflow on barge
324212	05-Feb-96	River Rouge	1,000 gal. Of coal tar pitch malfunction
324213	05-Feb-96	Ecorse	500 gal. Of oil and coal tar released
325423	11-Feb-96	River Rouge	unknown oil sheen
325967	14-Feb-96	Ecorse	unknown oil sheen at seawall
326297	15-Feb-96	River Rouge	tar released at outfall
328056	26-Feb-96	Trenton	unknown oil sheen
336181	13-Apr-96	Detroit	fuel oil #2-D at Conner's Creek
338528	26-Apr-96	Ecorse	unknown oil sheen
338613	27-Apr-96	Lincoln Park	unknown yellow sheen in storm drain
341357	14-May-96	River Rouge	misc. lubricating oil leak

343872	26-May-96	Ecorse	unknown oil sheen at outfall
344031	28-May-96	Trenton	unknown oil sheen
347492	17-Jun-96	Ecorse	two unknown oil sheens
347757	18-Jun-96	Ecorse	unknown oil sheen
353133	24-Jul-96	Dearborn	270,000 gal. Of zinc waste overflow due to malfunction
353819	29-Jul-96	Detroit	unknown oil sheen
356366	12-Aug-96	Detroit	unknown oil sheen at basin outfall
358276	26-Aug-96	Hamtramck	3 gal. Of PCBs released during an accident
358919	29-Aug-96	Ecorse	unknown oil sheen at outfall #9
360412	09-Sep-96	Dearborn	zinc material leaked into storm drain
362385	25-Sep-96	Ecorse	unknown oil sheen at outfall #9
362737	28-Sep-96	Trenton	150 gal. of misc. lubricating oil leak
364200	12-Oct-96	Detroit	unknown oil sheen
365070	21-Oct-96	Ecorse	1 qt. Of misc. lubricating oil leak
366253	31-Oct-96	Detroit	fuel oil #2 discharge
367870	18-Nov-96	Ecorse	misc. lubricating oil flowing from outfall #9
368243	21-Nov-96	Ecorse	unknown oil sheen at outfall #9
368648	25-Nov-96	Ecorse	other oils at outfall #9
370357	13-Dec-96	Detroit	55 gal. Drum found floating in the river
371498	27-Dec-96	Ecorse	unknown oil sheen at outfall #9

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1997

Report No.	Date	Location	Remarks
373092	14-Jan-97	Ecorse	unknown oil sheen from outfall #8
375332	03-Feb-97	Ecorse	unknown oil sheen from outfall #9
376094	10-Feb-97	Ecorse	misc. lubricating oil from outfall #9
376114	10-Feb-97	Detroit	30 gal. Of misc. transformer oil leak
378719	03-Mar-97	River Rouge	2,000 gal. Of sulfuric acid spill at power plant
381510	25-Mar-97	Ecorse	misc. lubricating oil sheen at outfall #9
382603	04-Apr-97	Ecorse	misc. lubricating oil sheen at outfall #9
383412	12-Apr-97	Trenton	misc. lubricating oil spill at Edison power plant
391330	12-Jun-97	Ecorse	unknown oil sheen at outfall #9
391674	18-Jun-97	Ecorse	misc. lubricating oil sheen at outfall #9
397169	22-Jun-97	Ecorse	unknown oil sheen
393040	27-Jun-97	Detroit	1 gal. of misc. coal tar leak on barge
394300	09-Jun-97	Ecorse	100 gal. Of diesel oil spill during transfer
400915	25-Aug-97	Ecorse	other oil leak at outfall #9
402791	09-Sep-97	Ecorse	unknown oil sheen
402995	10-Sep-97	Detroit	unknown oil sheen
405350	28-Sep-97	Detroit	unknown foam, oily material on river
407022	10-Oct-97	Ecorse	100,000 lbs. of liquid iron spilled during train derailment
407063	10-Oct-97	Ecorse	1,000 gal. of cooling water leakage
409118	28-Oct-97	Ecorse	400 gal. Of slurry water from D4 blast furnace spill
410817	10-Nov-97	Ecorse	misc. lubricating oil leaking from equipment
412290	19-Nov-97	Ecorse	unknown oil sheen
415747	15-Dec-97	Detroit	unknown oil sheen
416545	19-Dec-97	Ecorse	misc. lubricating oil overflow

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1998

Report No.	Date	Location	Remarks
420035	16-Jan-98	Riverview	12 lbs. of ethylene oxide drained into the WWTP
421715	28-Jan-98	River Rouge	unknown oil sheen
425949	25-Feb-98	Detroit	unknown oil sheen
426454	01-Mar-98	River Rouge	1 gal. of misc. lubricating oil leak
432394	14-Apr-98	Ecorse	unknown oil sheen from outfall #16
432726	16-Apr-98	Detroit	unknown oil sheen
432736	16-Apr-98	Ecorse	unknown oil sheen
434500	29-Apr-98	River Rouge	unknown oil sheen from outfall #8
435170	03-May-98	Grosse Ile	unknown oil sheen
435233	04-May-98	Detroit	unknown oil sheen
439733	02-Jun-98	Detroit	paper products flowing into river
441172	11-Jun-98	River Rouge	unknown oil sheen
441315	12-Jun-98	Trenton	unknown oil sheen
441667	15-Jun-98	Detroit	Conner's Creek is black and smelly
442255	18-Jun-98	Ecorse	unknown oil sheen
442331	19-Jun-98	Ecorse	misc. lubricating oil at outfall #9
443563	27-Jun-98	Detroit	Captain's Choice discharging diesel oil
444756	07-Jul-98	Grosse Ile	unknown oil sheen
445544	12-Jul-98	Detroit	unknown oil sheen
449350	06-Aug-98	Detroit	25 gal. of oily sewage at Conner's Creek
449843	10-Aug-98	Detroit	unknown oil sheen
450492	14-Aug-98	Detroit	1 gal. of #6 fuel oil spilled during fueling
458442	05-Oct-98	Grosse Ile	unknown oil sheen
463215	09-Nov-98	Ecorse	unknown oil sheen

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1999

Report No.	Date	Location	Remarks
469717	06-Jan-99	River Rouge	220 gal. of sodium hypochlorite released at power plant
470811	16-Jan-99	Ecorse	hydrochloric acid tank leak
471591	23-Jan-99	River Rouge	10 gal. of misc. lubricating oil leak on air compressor
472518	01-Feb-99	Wyandotte	unknown oil sheen
473274	08-Feb-99	Detroit	overflow of #2 fuel oil at containment drain
477602	21-Mar-99	Grosse Ile	unknown oil sheen
477885	23-Mar-99	Detroit	dead fish
482276	01-May-99	Gibraltar	discharge from DSC pond to Frank and Poet Drain
483546	13-May-99	Detroit	5 qt. of misc. lubricating oil in sunken boat
485150	26-May-99	Detroit	5 gal. of gasoline from sinking boat
485378	27-May-99	Detroit	spilled asphalt
486396	06-Jun-99	Detroit	20 gal. of diesel oil from bilge
487754	16-Jun-99	Grosse Ile	15 gal. of #2-D fuel oil leaked during fueling
488139	20-Jun-99	Ecorse	soapy film coming from sewer
488145	20-Jun-99	Ecorse	200 gal. of hydraulic oil from equipment failure
490947	12-Jul-99	Detroit	5 gal. of unleaded gasoline from sinking boat
492163	21-Jul-99	River Rouge	10 gal. of hydraulic fluid from boat leak

493134	29-Jul-99	Detroit	unknown oil sheen
494343	08-Aug-99	Detroit	unknown oil sheen
494509	09-Aug-99	Detroit	unknown oil sheen
494633	10-Aug-99	Detroit	misc. lubricating oil leaking from turbine
495310	17-Aug-99	Detroit	unknown oil sheen
495717	20-Aug-99	Detroit	jet fuel (JP-8) tanks pumped into sewer
495767	20-Aug-99	Detroit	unknown oil sheen
495939	20-Aug-99	Detroit	1.5 gal. of unleaded gasoline from sunken boat

Compendium of Position Papers

A Four Agency Framework of
Roles and Responsibilities for
Implementation of the
Detroit River, St. Clair River
and St. Marys River
Areas of Concern
Shared Remedial Action Plans

Feb. 2, 2000

Preface

The Great Lakes Water Quality Agreements (GLWQA) of 1972 and 1978 committed the governments of Canada and the United States to restore and enhance water quality in the Great Lakes System. The signing of the Amendments to the 1987 Protocol to the GLWQA further committed the governments of Canada and the United States to development and implementation of Remedial Action Plans (RAPs) for Areas of Concern (AOCs) in the Great Lakes. Three of these AOCs lie within rivers that act as shared natural boundaries between Canada and the United States, Ontario and Michigan – the Detroit River, St. Clair River and St. Marys River.

The United States and Canada have pledged their cooperation to restore these shared upper connecting channel AOCs under the terms of the GLWQA. A Four Agency Letter of Commitment was signed on April 17, 1998, by Environment Canada, Michigan Department of Environmental Quality, Ontario Ministry of the Environment, and the United States Environmental Protection Agency.

The letter identifies roles and responsibilities of the Four Agencies for the three shared AOCs, details commitments and strategies and highlights the importance of leadership. The Four Agencies will demonstrate their leadership through visibility, by empowering local leadership, by contributing to and facilitating implementation activities, by recognizing successes, by actively pursuing solutions to problems, by helping to define research needs and gaps and by facilitating the transfer of information and methodologies.

The Four Agencies have developed the following position papers to explain how commitments made under the Letter of Commitment and the GLWQA will be applied to the shared AOCs. This compendium contains the 1998 Four Agency Letter of Commitment, the position papers, and the appendices.

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1. Administration

Letter of Commitment References

1.1 The Four Agencies recognize that each has responsibilities to support commitments made in the GLWQA as well as responsibilities under its respective regulatory system which each Agency will continue to adhere to.

1.2 The Four Agencies recognize the need to cooperate to achieve the goals outlined in each shared AOC as well as the need for each Agency to accomplish this through their individual distinctive forms of government, institutional arrangements, and approaches to RAP development and implementation.

1.3 The roles and responsibilities of the Four Agencies defined in this Letter of Commitment will apply to all shared AOCs.

1.4 Canadian Agencies are to have the primary responsibility for the administration of the shared activities for the St. Marys and St. Clair RAPs, and the U.S. Agencies are to have the primary responsibility for the administration of the shared activities for the Detroit River RAP.

1.5 The Four Agencies intend to identify a contact/liaison for each of the shared AOCs.

1.6 The Four Agencies recognize that part of the shared accountability is to promote RAP implementation and to persuade other implementers to undertake remedial work within the appropriate jurisdiction.

1.7 The Four Agencies are committed to facilitating development of implementation mechanisms for the shared AOCs with local stakeholders and the public. It is recognized that the Four Agencies may contribute funds or other resources, separately or within partnerships, in support of these mechanisms and that these implementation mechanisms may be different for each shared AOC.

Introduction

The following administrative roles and responsibilities structure provides a mechanism for cooperation between Canada and the United States, while recognizing the national, provincial and state regulatory systems already in place.

- Individual agencies will focus their existing and new programs and resources to restore the shared Areas of Concern (AOCs) and will encourage other organizations to do likewise.

- To achieve the goals outlined in each shared AOC, the Four Agencies will cooperate on issues such as:
 - data sharing and consistency
 - promoting standardization of environmental criteria
 - binational delisting criteria
 - monitoring
 - public involvement
 - research
 - reporting progress
 - pooling resources
- To facilitate cooperation, the Four Agencies establish the following new committees under the Letter of Commitment, and agree to staff these committees at the appropriate level.

Four Agency Letter of Commitment Structure

1. Four Agency Management Committee – This umbrella committee oversees the shared AOCs. The membership consists of senior representatives from each of the Four Agencies. Their charge is to ensure that these RAPs proceed in a timely, consistent manner and that binational tasks are completed.
 2. Working Group – This group ensures that technical issues are addressed, mediates disputes, coordinates state, provincial and federal resources among the shared AOCs and ensures that progress reports are issued in a timely manner. The Working Group is not responsible for writing the progress reports. Membership consists of representatives from each of the Four Agencies.
 3. Ad-Hoc Technical Teams – Teams of technical experts will be called as needed by the Four Agencies to resolve technical issues and to review RAP documents.
- The roles and responsibilities of the Four Agencies defined in the Letter of Commitment will apply to all shared AOCs.

- Working in conjunction with stakeholders, the lead agencies will be primarily responsible for activities such as:
 - preparation, printing, and distribution of Progress Reports
 - support for and convening the biennial meeting
 - binational communication
 - binational public involvement and outreach
 - coordinating development and review of binational delisting criteria
 - coordinating and facilitating monitoring to track progress toward delisting

- The agency contact will be the working group member for the shared AOCs. See Appendix 2.

- The Four Agencies will promote RAP implementation by applying their individual programs and encourage others to do the same by:
 - advocacy within respective jurisdictions
 - visibility
 - leadership by example
 - innovative partnerships
 - creative funding
 - providing information to and involving elected officials
 - promoting multi-media environmental restoration
 - researching and promoting socio-economic/environmental benefits of remediation

- The Four Agencies are committed to facilitating development of implementation mechanisms for the shared AOCs with local stakeholders and the public. The Four Agencies may contribute funds or other resources, separately or within partnerships, in support of these mechanisms and these implementation mechanisms may be different for each shared AOC.

Local RAP Implementation Structures

- Public and stakeholder involvement is an integral part of local RAP structures. These action oriented local structures have been or will be developed for each of the shared AOCs and are presented in Appendix 4. Responsibilities include:
 - coordinating and facilitating RAP implementation
 - establishing priorities
 - seeking funding
 - developing partnerships
 - serving as a vehicle for public and stakeholder activities
 - conducting necessary studies

2. Binational Delisting

Letter of Commitment References

2.1 The Four Agencies have responsibility to coordinate continued development and review of measurable and achievable delisting criteria and will ensure the process used to develop these criteria involves the public and stakeholders.

2.2 The Four Agencies intend to develop a process for delisting shared AOCs, recognizing differences in each of the AOCs in implementation of this process.

2.3 The Four Agencies recognize the need to coordinate and facilitate monitoring and surveillance efforts to track progress towards delisting.

Introduction

The Four Agencies will coordinate a binational delisting process and will coordinate and facilitate monitoring efforts to track progress toward delisting. The Four Agencies will also oversee the peer review of the redesignation of beneficial uses and delisting of an Area of Concern (AOC) to ensure the process is credible and scientifically defensible.

Delisting Criteria

"The Parties shall cooperate with State and Provincial Governments to classify Areas of Concern by their stage of restoration progressing from the definition of the problems and causes, through the selection of remedial measures, to the implementation of remedial programs, the monitoring of recovery, and, when identified beneficial uses are no longer impaired and the area restored, the removal of its designation as an Area of Concern." [GLWQA, Annex 2, 4.(c)] Delisting criteria are benchmarks used to assess the progress toward restoration of use impairments.

The Four Agency Working Group will oversee the continuing development of delisting criteria and setting of interim restoration targets. Once delisting criteria have been approved for an AOC, the Four Agency Working Group will periodically review and evaluate the validity and achievability of the delisting criteria through internal and external peer review. Development and review of delisting criteria will be done in consultation with the public and stakeholders.

The following principles are to be applied in the development and evaluation of these criteria:

- Delisting criteria should be developed and periodically reviewed on a site specific basis by the respective federal, state, and provincial agencies, in conjunction with the public and stakeholders.
- Delisting criteria should be premised on:
 - locally defined usage goals and related environmental objectives for the water body containing the AOC
 - applicable federal, provincial or state regulations, objectives, guidelines, standards and policies
 - the principles and objectives embodied in Annex 2 and supporting parts of the GLWQA
- Delisting criteria should be based on measurable indicators (e.g., numeric concentrations of a particular pollutant within the AOC) wherever possible.
- Delisting of a particular impairment in an AOC can occur if it can be demonstrated that the impairment is not solely local geographic extent, but is typical of lake wide conditions. Such delisting would be contingent on evidence that sources within the AOC are controlled.
- Delisting of a particular impairment can also occur when it is demonstrated that the impairment is due to natural rather than human causes (to be clarified with the IJC in the context of the GLWQA Annex 2 Review).

Process for Redesignation of Beneficial Use(s)

1. Recommendation for Redesignation –The local Remedial Action Plan (RAP) implementation committee(s) recommends a change of status. It should be accompanied by documentation and data to substantiate that the status of a beneficial use be redesignated.
2. Peer Review – The Four Agency Working Group designates a Technical Review Team to review the request. This Technical Review Team shall be composed of experts not directly involved in the RAP that is being examined, and may include non-Agency experts or others, as the Four Agencies deem appropriate. The respective lead national, provincial or state agencies will convene a review meeting, at which the local implementation committee presents the request for

redesignation with supporting data and documentation to the Technical Review Team. This meeting shall be open to members of the local RAP committee(s) and to the general public. This review meeting is intended to be an informal session to allow the experts and the public to exchange information and ask clarifying questions. The review team may need additional information and may not necessarily come to a decision on the recommendation by the end of the meeting. The Technical Review Team provides their recommendation to the Four Party Management Team.

3. Decision by Management Team – The Four Agency Management Team issues a decision on whether to support the recommendation within a reasonable time frame.
 - If the Four Agency Management Team supports the recommendation, they will send an official statement of concurrence to the local RAP implementation committee and the Regional Office of the International Joint Commission (IJC).
 - If the Four Agency Management Team does not support the recommendation or needs more information, it will formally respond to the local implementation committee and remand the documentation to the Four Agency Working Group. The Working Group will then resolve any remaining issue(s) on the documentation with the local RAP implementation committee (which may include informal Dispute Resolution).
4. Celebration of Achievement – The local RAP implementation group who initiated the request should then issue a notice of the restoration of beneficial use(s) (if delisting a previously impaired beneficial use) and acknowledge this milestone in conjunction with the Four Agencies. The Four Agencies will also issue similar notices and highlight this achievement.

Process for Delisting an Area of Concern

The ultimate goal for a RAP is to restore and protect beneficial uses in an AOC. Delisting of an AOC would occur when all the individual delisting targets/criteria have been met.

The GLWQA states that the Parties *"in cooperation...with the Commission shall designate Areas of Concern."* The "Four Parties" interpret the term "cooperate" to mean that the parties, while ultimately responsible for listing (and delisting), will seek input from the International Joint Commission (IJC) on any recommendation to delist an AOC.

A final RAP Report would be produced and submitted to the IJC for review and comment when *"monitoring indicates that identified beneficial uses have been restored based on...an evaluation of remedial measure implementation and effectiveness; and the surveillance and monitoring process...(that has) track(ed) the effectiveness of the measures and the confirmation of the restoration of uses"* [GLWQA Annex 2, 4.(d)(iii)].

The process for delisting an AOC will be initiated by the local implementation committee when all the delisting criteria have been met. The Four Agencies will then oversee the preparation of a Final RAP Report and coordinate the delisting process. The following steps will be undertaken to delist an AOC:

1. Recommendation for Delisting – The Lead Agencies and the local RAP implementation committee(s), working in consultation with the public and stakeholders, submit a recommendation to delist an AOC and a Draft Final RAP Report to the Four Agency Working Group.
2. Four Agency Review – The Four Agency Working Group coordinates review of draft final RAP Report, including content and policy review, technical review and informal consultation with IJC staff. Working with the local RAP implementation committee(s), the Working Group will also be responsible for identifying additional data needs, resolving policy issues, and overseeing revisions to the report.
3. Public Consultation – The local RAP implementation committee in consultation with the Working Group then formally presents the Revised Final RAP Report for review and comment to the public and stakeholders. After considering comments, the Lead Agencies in consultation with the local RAP implementation committee(s) prepares the Final RAP Report.
4. IJC Great Lakes Office Consultation – The Four Agency Management Committee consults with the Director of the IJC Great Lakes Regional Office on the final RAP Report and the recommendation to delist.
5. Four Agency Approval – The Four Agencies send letters recommending the AOC delisting to the United States State Department and the Canadian Department of Foreign Affairs.
6. IJC Input – The final RAP report is transmitted by the offices of the United States Secretary of State and the Canadian Minister of Foreign Affairs to the IJC for review and comment.
7. Delisting – The United States Secretary of State and the Canadian Minister of Foreign Affairs officially remove the affected water body from the list of AOCs.

Monitoring

The Four Agencies will coordinate and facilitate monitoring efforts to establish baseline conditions and track progress toward the restoration of beneficial uses. The Four Agencies will work with the local RAP implementation committees to develop a Monitoring Plan for each AOC. For the St. Clair and Detroit Rivers the goal of the Four Agency Working Group will be to explore the feasibility of developing a coordinated monitoring program for the "Lake Huron to Lake Erie corridor", building on existing efforts.

The Four Agencies will identify and coordinate monitoring programs to maximize consistency and effectiveness. These programs should include, but are not limited to: permit monitoring, utility and municipality monitoring, supplemental monitoring obtained through legal settlements, and environmental quality monitoring conducted by citizens, industry, government agencies and academic institutions.

Monitoring Plans for each AOC will be developed in accordance with the schedule of the initial Progress Reports. They will be updated as part of future Progress Reports.

3. Public Involvement and Outreach

Letter of Commitment References

3.1 The Four Agencies have collective responsibility to ensure public and stakeholder involvement is an integral part of the RAP process.

3.2 The Four Agencies are committed to taking leadership for celebration of implementation successes, including formal recognition of the contribution towards implementation by volunteers or specific implementors.

1.7 The Four Agencies are committed to facilitating development of implementation mechanisms for the shared AOCs with local stakeholders and the public. It is recognized that the Four Agencies may contribute funds or other resources, separately or within partnerships, in support of these mechanisms and that these implementation mechanisms may be different for each shared AOC.

2.1 The Four Agencies have responsibility to coordinate continued development and review of measurable and achievable delisting criteria and will ensure the process used to develop these criteria involves the public and stakeholders.

4.1 The Four Agencies intend to develop one format for reporting progress to both the International Joint Commission and the public biennially. These Progress Reports, developed in conjunction with local stakeholders, are to be submitted jointly by the Four Agencies upon agreement to their contents. The focus of the Progress Reports will be to reflect progress in implementation, update technical information, assess progress towards achieving the delisting criteria, as well as highlighting progress towards achieving priorities defined by previous reports.

5.1 The Four Agencies recognize that their leadership will be an important factor in the cleanup of the shared AOCs. Four Agency leadership is to be demonstrated by visibility, by empowering local leadership, by contributing to and facilitating implementation activities, by recognizing successes, by actively pursuing solutions to problems, by helping to define research needs and gaps and by facilitating the transfer of information and methodologies.

Introduction

This Issue Paper addresses public involvement and outreach as an integral part of the Remedial Action Plan (RAP) process in Areas of Concern (AOCs).

The public and stakeholders are an integral part of the RAP process. Their participation validates the concepts of environmental protection and restoration through activities demonstrating the community concern for those goals. The agencies will support local, national, and international actions through grants and in-kind participation. Those activities are intended to:

- maintain public interest in and awareness of local environmental quality issues through public involvement strategies
- provide a continuing basis for broader community support for RAP implementation
- facilitate funding and partnership opportunities to restore AOCs

In order to support and promote the public involvement and outreach efforts of local implementers and implementation committees, the Four Agencies will provide financial and in-kind support for the following core binational public involvement activities:

1. Biennial Reports: At least one for each AOC, as described in the Progress Reporting Position Paper.
2. Biennial Meeting: A biennial meeting in each AOC to coincide with release of the Biennial Report. The target audience is implementors and decision-makers. The meeting will be advertised to the public. Objectives of the meeting are to:
 - report on accomplishments and environmental progress
 - heighten public awareness and support of RAP implementation and issues
 - identify priority projects and funding opportunities
 - recognize volunteers and implementors
 - facilitate information sharing and coordination of activities
 - acclaim successes
3. Technical reports: Prepared for each AOC. However, any technical report with scholarly language will have a companion document or executive summary containing the same information in plain language.
4. Electronic information sharing: Current information about the shared AOCs will be maintained on the Great Lakes Information Network (GLIN) and the Great Lakes Information Management Resource (GLIMR). All public documents, RAPs, and Biennial Reports will be available on line. List serves and electronic bulletin boards will be developed to facilitate information sharing.
5. Workshops: The Four Agencies will involve the public and stakeholders in development and periodic review of delisting criteria or other relevant subjects as agreed upon.

6. Fact sheets, news releases and periodic updates: The Four Agencies will collaborate and provide financial and in-kind support for creating and distributing fact sheets, technical reports, news releases, and other periodic updates on activities.

Other Activities

In addition to the above, the Four Agencies on an AOC-specific basis may provide support for other public involvement activities such as:

- education programs
- tours of AOCs
- displays
- forums or workshops on specific topics

The Four Agencies will ensure that stakeholders are engaged in the process, in partnership with community organizations, and recognize the accomplishments of volunteers and implementers through certificates or awards as well as news releases citing achievements.

A recognition ceremony will be held at the biennial meeting during which volunteers and implementers will receive acknowledgments for outstanding accomplishments.

4. Progress Reporting

Letter of Commitment References

4.1 The Four Agencies intend to develop one format for reporting progress to both the International Joint Commission and the public biennially. These Progress Reports, developed in conjunction with local stakeholders, are to be submitted jointly by the Four Agencies upon agreement to their contents. The focus of the Progress Reports will be to reflect progress in implementation, update technical information, assess progress towards achieving the delisting criteria, as well as highlighting progress towards achieving priorities defined by previous reports.

Introduction

The Four Agencies agree to develop a single format for reporting progress to the International Joint Commission (IJC) and the public through the issuance of biennial reports. These reports are to be developed in conjunction with local stakeholders and submitted jointly by the Four Agencies upon agreement to their contents. The Four Agencies will ensure that these reports are actively distributed to the general public and are made available electronically.

Format

The Four Agencies intend that the Biennial Reports be short, objective updates on progress of the Remedial Action Plans (RAPs). These periodic reports are not intended to replace longer technical documents that may be issued separately. One (1) binational report will be issued for each shared Area of Concern (AOC), instead of separate Canadian and U.S. submissions. The report will focus on the status of RAP implementation activities, update technical information, highlight progress on priority recommendations from previous reports and note progress toward the restoration of beneficial use impairments and delisting criteria.

The Biennial Report will briefly reference past reports to provide the reader with adequate background information. A list of RAP related publications and other data sources will be included in the report. The Biennial Report will be based on detailed technical reports and analyses. Summary information and analysis of data will be included rather than detailed technical information or raw data.

While the precise format of the report must reflect the needs of the local site, each Biennial Report must contain, at a minimum, the following components:

1. AOC Status

This section relays the current status of the RAP in a visual format such as charts or graphs. The use of visual aids will provide a quick reference guide to progress on implementation of cleanup actions and the status of restoration of beneficial uses as compared to the previous reporting period.

2. Highlights - Overview - Executive Summary

This section serves as an opportunity to flag major developments, issues, trends, events, benchmark reports, restoration, or near restoration, of a given beneficial use. This section should also include overview comments for a given sector (e.g., industrial abatement in an AOC proceeding faster than expected). The primary function of this section is to encapsulate the RAPs current status and progress.

3. Progress On Implementation

This section should report on tangible implementation, organized by major subject area (e.g., issue based or activity based). The report should contain information on progress, next steps, an implementation outlook for each subject area, and maps locating each action in the AOC.

4. Progress On Restoration

The intent of this section is to go beyond simple reporting of monitoring actions or data. The report should contain summaries of monitoring results, identify trends if present, and indicate progress toward restoring individual impaired uses and achieving delisting criteria. This section also provides the opportunity to demonstrate incremental progress.

5. Schedule and Implementation Outlook

This section provides the opportunity to flag major forthcoming events, timing of cleanup activities and other priorities. The information should be summarized in a time line format.

6. Public Involvement and Outreach

This section highlights public involvement and outreach activities that occurred during the reporting period.

7. Other Activities

This section provides the opportunity to flag activities not included above but still of importance. For example, such activities include community volunteer cleanup days, activities by groups not affiliated with the local RAP implementation structure, etc.

Authorship and Audience

Working in conjunction with other stakeholders, the lead agencies will have overall responsibility for preparation, printing, and distribution of biennial Progress Reports. Individual multi-stakeholder RAP Implementation Teams/Committees will play a significant role in report preparation. The Four Agency Working Group will be responsible for coordinating review of the Progress Report, including circulating the Report for review, responding to comments, and then forward it to the Four Agency Management Team for final approval and transmission to the IJC and the public.

The target audiences for the report are the local stakeholders involved in RAP implementation.

Cost

The Four Agencies will provide financial assistance and in-kind support to assist in report preparation and communication and dissemination with a greater share of support provided by the designated lead agencies for each AOC. To minimize additional work, the format intentionally borrows heavily from the current reporting styles for RAPs used by Canada-Ontario and the Michigan RAP strategy.

Frequency and Timing

The parties must report at least biennially and can report more frequently if desired. The schedule for completion of the first progress reports is as follows:

Detroit River	Spring 2000
St. Clair River	Fall 2000
St. Marys River	Fall 2001

Subsequent reports will be issued every two years to coincide with either State of the Lakes Ecosystem Conference (SOLEC) or the IJC biennial meeting. The Working Group will monitor document production schedules and take steps to ensure the schedules are met.

Electronic Reports

The Four Agencies will ensure that the Biennial RAP related reports are posted electronically on web sites such as the Great Lakes Information Network (GLIN) and the Great Lakes Information Management Resource (GLIMR), and will develop list serves and electronic bulletin boards to stimulate AOC related discussions. In addition, a limited number of printed copies will be made available by the designated lead agencies. These sites will be updated annually and more frequently if necessary.

Reports posted electronically will include hyperlinks for program and contact information, data sources and related sites. Electronic reports should also contain provisions to accept comments electronically in order to facilitate feedback on the reports.

Final RAP Report

When delisting criteria have been met, a final RAP report will be prepared which summarizes the strategy implemented to restore beneficial uses and to meet locally defined water quality goals in the AOC. The Report should also reference previous Biennial Reports and include a list of publications and actions that demonstrate completion of Stages 1, 2 and 3 of the RAP process detailed in Annex 2 of the Great Lakes Water Quality Agreement. The core of the document should focus on evidence that demonstrates delisting criteria have been met. The report should include a Four Agencies commitment for environmental monitoring to ensure environmental quality is being maintained.

Appendix 1

Four Agency Letter of Commitment

LETTER OF COMMITMENT

A FOUR AGENCY FRAMEWORK OF ROLES AND RESPONSIBILITIES FOR THE IMPLEMENTATION OF THE DETROIT RIVER, ST. CLAIR RIVER AND ST. MARYS RIVER SHARED REMEDIAL ACTION PLANS

1 - WHEREAS the governments of Canada and the United States entered into the Great Lakes Water Quality Agreements of 1972 and 1978 (herein referred to as the GLWQA) and reaffirmed their determination to restore and enhance water quality in the Great Lakes System with the signing of amendments as proclaimed in the 1987 Protocol to the GLWQA which, among other things, commits Canada and the United States, in cooperation with other jurisdictions, to undertake the development and implementation of Remedial Action Plans (RAPs) for Areas of Concern (AOCs);

2 - AND WHEREAS in accordance with Part 1 of the Canada Water Act, Canada and Ontario entered into an Agreement Respecting Great Lakes Water Quality in 1971 and renewed in 1976, 1982, 1986 and 1994 in order to implement the GLWQA and for which specific targets were agreed to for Canadian and shared RAPs;

3 - AND WHEREAS the United States Federal government and the State of Michigan have defined roles for the development and implementation of RAPs under the 1972 Clean Water Act, as amended by the Great Lakes Critical Programs Act of 1990, in support of the goals agreed to under the GLWQA;

4 - AND WHEREAS the State of Michigan and the Province of Ontario, under a 1985 Letter of Intent, committed to leadership roles for the development but not the implementation of RAPs for three of the binational rivers: the Detroit River, the St. Clair River, and the St. Marys River (hereinafter referred to as the shared AOCs);

5 - AND WHEREAS Environment Canada, the Ontario Ministry of Environment, the United States Environmental Protection Agency, and the Michigan Department of Environmental Quality (herein referred to as the Four Agencies) are all committed to the restoration of the shared AOCs and to ensuring stakeholder and public involvement;

THEREFORE the Four Agencies, recognizing the mutual benefits of cooperating on matters of binational interest, recognizing that restoration of the boundary waters cannot be achieved independently by any one Agency and recognizing that each of the Four Agencies is accountable to their citizens for continued environmental improvement and protection, herein intend to implement the following roles and responsibilities:

1. Administration:

1.1 The Four Agencies recognize that each has responsibilities to support commitments made in the GLWQA as well as responsibilities under its respective regulatory system which each Agency will continue to adhere to.



Ontario

Ministry of the Environment
Ministère de l'Environnement



MICHIGAN
Department of Environmental Quality

1.2 The Four Agencies recognize the need to cooperate to achieve the goals outlined in each shared AOC as well as the need for each Agency to accomplish this through their individual distinctive forms of government, institutional arrangements, and approaches to RAP development and implementation.

1.3 The roles and responsibilities of the Four Agencies defined in this Letter of Commitment will apply to all shared AOCs.

1.4 Canadian Agencies are to have the primary responsibility for the administration of the shared activities for the St. Marys and St. Clair RAPs, and the U.S. Agencies are to have the primary responsibility for the administration of the shared activities for the Detroit River RAP.

1.5 The Four Agencies intend to identify a contact/liaison for each of the shared AOCs.

1.6 The Four Agencies recognize that part of the shared accountability is to promote RAP implementation and to persuade other implementors to undertake remedial work within the appropriate jurisdiction.

1.7 The Four Agencies are committed to facilitating development of implementation mechanisms for the shared AOCs with local stakeholders and the public. It is recognized that the Four Agencies may contribute funds or other resources, separately or within partnerships, in support of these mechanisms and that these implementation mechanisms may be different for each shared AOC.

2. Binational Delisting:

2.1 The Four Agencies have responsibility to coordinate continued development and review of measurable and achievable delisting criteria and will ensure the process used to develop these criteria involves the public and stakeholders.

2.2 The Four Agencies intend to develop a process for delisting shared AOCs recognizing differences in each of the AOCs in implementation of this process.

2.3 The Four Agencies recognize the need to coordinate and facilitate monitoring and surveillance efforts to track progress towards delisting.

3. Public Involvement and Outreach:

3.1 The Four Agencies have collective responsibility to ensure public and stakeholder involvement is an integral part of the RAP process.

3.2 The Four Agencies are committed to taking leadership for celebration of implementation successes, including formal recognition of the contribution towards implementation by volunteers or specific implementors.

4. Progress Reporting:

4.1 The Four Agencies intend to develop one format for reporting progress to both the International Joint Commission and the public biennially. These Progress Reports, developed in conjunction with local stakeholders, are to be submitted jointly by the Four Agencies upon agreement to their contents. The focus of the Progress Reports will be to reflect progress in implementation, update technical information, assess progress towards achieving the delisting criteria, as well as highlighting progress towards achieving priorities defined by previous reports.

5. Leadership:

5.1 The Four Agencies recognize that their leadership will be an important factor in the cleanup of the shared AOCs. Four Agency leadership is to be demonstrated by visibility, by empowering local leadership, by contributing to and facilitating implementation activities, by recognizing successes, by actively pursuing solutions to problems, by helping to define research needs and gaps and by facilitating the transfer of information and methodologies.

5.2 The Four Agencies acknowledge that, as defined in the GLWQA, the Federal Governments have committed to cooperate with State and Provincial Governments in the development and implementation of RAPs.

6. Commitment:

6.1 This Letter of Commitment reflects the firm commitment of the Four Agencies to implement the above-mentioned actions, without giving rise to legal obligations on the governments or on the public.

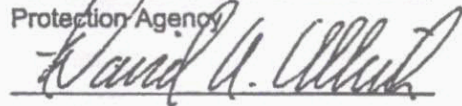
7. Endorsement:

We the undersigned hereby accept the terms of this Letter of Commitment, signed at Windsor, Ontario, Canada this 17th day of April 1998:

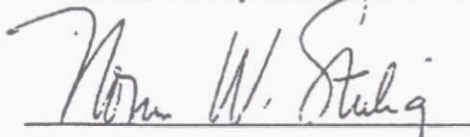
For Environment Canada



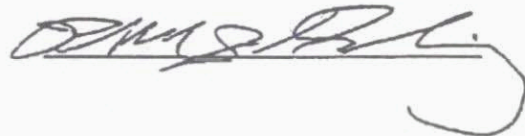
For the United States Environmental
Protection Agency



For Ontario Ministry of the Environment



For the Michigan Department of
Environmental Quality



Appendix 2

Working Group Contacts

The following are the designated members of the Working Group. These individuals will serve as the initial point of contact for the Four Agency Letter of Commitment on the shared Remedial Action Plans (RAPs) and for any questions or comments related to the position papers.

Environment Canada

Rimi Kalinauskas
Restoration Programs Division
Environment Canada, Ontario Region
4905 Dufferin Street
Downsview, Ontario M3H 5T4
(416) 739-5836
rimi.kalinauskas@ec.gc.ca

Ontario Ministry of the Environment

Michael Moroney
Ontario Ministry of the Environment
Samia District Office
1094 London Road
Samia, Ontario N7S 1P1
(519) 336-4030
moronemi@ene.gov.on.ca

United States Environmental Protection Agency

Allen Melcer
U.S. EPA (WU-16J)
Underground Injection Control Branch
77 W. Jackson Blvd.
Chicago, IL 60604
(312) 886-1498
melcer.allen@epa.gov

Michigan Department of Environmental Quality

Richard Hoblar
Michigan Department of Environmental Quality
Surface Water Quality Division
P.O. Box 30273
Lansing, Michigan 48933
517-335-4173
hoblar@state.mi.us

Appendix 3

Dispute Resolution

Introduction

The Four Agencies will do their utmost to cooperate to restore the shared Areas of Concern (AOCs). However, disputes between the Agencies or between parties involved in the shared Remedial Action Plans (RAPs) may occur. In order to ensure that disputes are settled rapidly, consistently, and in the fairest manner possible, the following procedures have been developed. This process is intended to be both simple and flexible.

The dispute resolution process is not intended to replace consensus-based decision making and/or conflict resolution tools at the disposal of local implementation committees including committee procedural process, neutral facilitation, vote by committee, or other tools. The Working Group is available to informally assist RAP participants in resolving disputes. The following formal arbitration process should be invoked only after all attempts to resolve a dispute have been exhausted.

Dispute Resolution Process

The Working Group will be responsible for facilitating resolution of disputes that may arise between RAP participants, including:

1. The federal, provincial, and state governments
2. Ad hoc committees
3. RAP Implementation Groups

These procedures apply only to disputes concerning the scope, content or implementation of the shared RAPs.

Format of a Notice of Dispute

A group initiates the dispute resolution procedures by submitting a formal Notice of Dispute to the Working Group and to the other party(ies) in dispute. The Notice of Dispute should be limited to two pages in length if possible. The format of the Notice of Dispute consists of the following elements:

1. name of the group initiating the dispute resolution process
2. other party(ies) to the dispute
3. nature of the dispute
4. a statement of position
5. brief technical and legal support for the stated position
6. actions taken to resolve the dispute

Dispute Arbitration Procedures

1. The disputing parties shall first make all reasonable attempts at settlement through other means of resolution. The dispute resolution process begins when a written Notice of Dispute is sent by mail, facsimile or e-mail to the Working Group and other parties to the dispute.
2. The Working Group will request all parties to submit a statement of their issues, similar in format to the Notice of Dispute. The parties must submit this information within twenty (20) working days of notification from the Working Group. During this period the parties should continue to engage in further negotiations to resolve the dispute.
3. If the parties to the dispute cannot resolve it informally through discussions, then within fifteen (15) working days after the completion of step #2 the Working Group will convene and render a decision with management concurrence.

The decision reached by the Working Group and approved by the Four Agency Management Committee will be one of the following:

- a. a resolution to the dispute
- b. an assignment of an outside expert to further mediate the dispute
- c. a request for more information or time to reach a decision, including a description of the additional information that is needed or a deadline for delivering the decision
- d. an elevation of the dispute to the Four Agency Management Committee
- e. remand to the parties to resolve

4. All draft dispute resolutions proposed by the Working Group shall be sent to the Four Agency Management Committee for concurrence. If the Four Agency Management Committee does not concur with the proposed resolution, the Working Group will revise the resolution in accordance with their suggestions.

Invocation of the dispute resolution procedures outlined above shall not operate to the prejudice of any party. Any party will remain free to challenge federal, provincial or state action as allowed under law.

Sample Notice of Dispute

NOTICE OF DISPUTE

Date:

Initiating Party:

Other Parties to the Dispute: List any party in opposition to the position advocated by the initiating party.

Background: Provide information on the technical and/or programmatic issue that is under dispute, including information on the nature and causes of the dispute.

Statement of Position: A brief summation of the position advocated by the initiating party.

Justification: A brief statement of why the position advocated is correct.

Action Taken: Steps taken to date to resolve the dispute. Such actions can include the following examples:

1. Discussions with the binational steering committee
2. Vote by the steering committee and all subcommittees
3. Neutral facilitation
4. Discussion with counterpart groups from the other binational RAPs

Appendix 4

Local Remedial Action Plan Implementation Structures

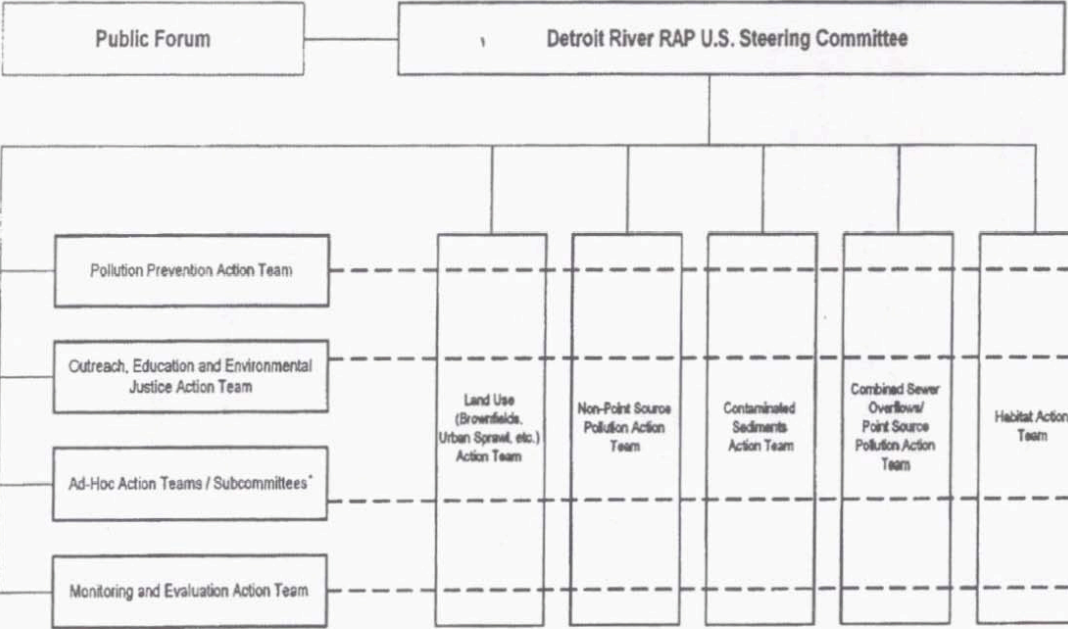
Detroit River Area of Concern - United States

Detroit River Area of Concern - Canada

St. Clair River Area Of Concern

St. Marys River Area of Concern - An implementation structure for the St. Marys River Area of Concern is under development

DETROIT RIVER REMEDIAL ACTION PLAN TEAM STRUCTURE



* Ad-Hoc Implementation Teams / Subcommittees will be formed as needed

The Detroit River Canadian Cleanup Committee

A major success for the region's environment in 1998 was the establishment of the Detroit River Canadian Cleanup Committee. The community based partnership of industry, government, academic, environmental and community organizations came together to work collectively in helping to heal the Detroit River.

In meeting the spirit of the Canada-U.S. Great Lakes Water Quality Agreement, the purpose of the Committee is to cleanup, enhance and sustain the ecosystem of the Detroit River and its tributary watersheds. The Detroit River Canadian Cleanup initiative builds on the Remedial Action Plan process which was active in the Detroit River Area of Concern from 1984 to 1996. The initiative was restarted to ensure that the Detroit River continues to contribute to a healthy environment, economy and community in the region. The initiative aims to improve the following aspects of the Detroit River ecosystem that are currently impaired at an unacceptable level:

- restrictions on fish and wildlife consumption
- tainting of fish and wildlife flavor
- degradation of fish and wildlife populations
- fish tumors or other deformities
- bird or animal deformities or reproductive problems
- degradation of benthos
- restriction on dredging activities
- restrictions on drinking water taste and odor
- beach closings
- degradation of aesthetics
- loss of fish and wildlife habitat
- exceedance of water quality standards/objectives

Roles and Responsibilities of the Detroit River Cleanup Committee

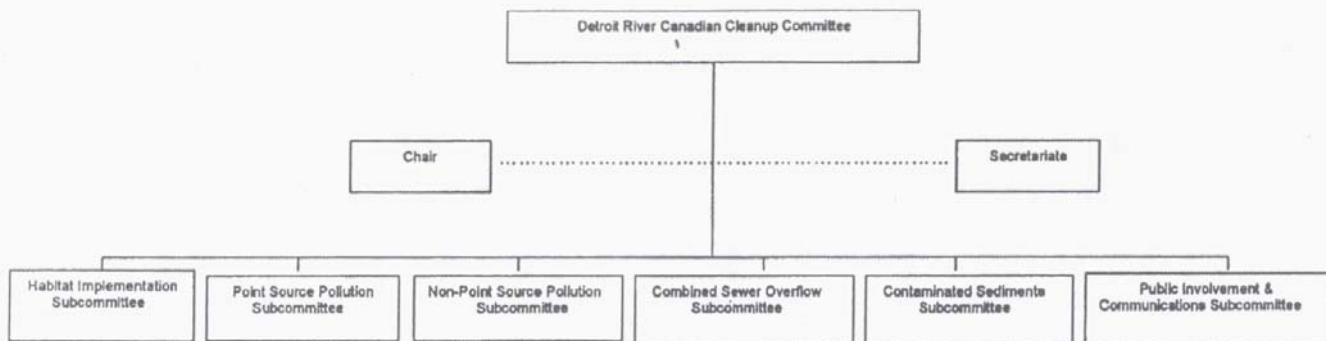
- coordinating Canadian cleanup and enhancement activities
- promoting cleanup action
- promoting partnerships
- developing multi-year plans and budgets that are project and program driven
- reporting regularly on progress to the community and agencies
- establishing criteria and time lines to measure progress

- developing an overall communication plan
- encouraging individual actions (Friends of Watersheds, Turkey Creek, Little River, Canard River, Detroit River)
- identifying technical issues requiring resolutions
- coordinating and consulting on binational programs with U.S. Counterparts
- providing advice on binational issues such as de-listing criteria, outreach activities
- identifying and actively pursuing funding sources
- answering to accountability mechanisms

Detroit River Canadian Cleanup Committee Partners

Canadian Salt Company Limited
 Citizens Environment Alliance
 City of Windsor
 Environment Canada
 Essex County Federation of Agriculture
 Essex County Field Naturalists
 Essex Region Conservation Authority
 Ford of Canada
 General Chemical
 Little River Enhancement Group
 Ontario Ministry of the Environment
 Chair of each Subcommittee
 Project Green
 Town of Amherstburg
 Town of LaSalle
 University of Windsor
 Windsor Chamber of Commerce
 Windsor & District Labour Council
 Windsor Environmental Advisory Council
 Windsor Heavy Construction Association

DETROIT RIVER CANADIAN CLEANUP COMMITTEE ORGANIZATIONAL CHART



Note: The CSO, Contaminated Sediments, NPS and Point Source Subcommittees meet together and essentially function as one Technical Subcommittee.

St. Clair River Area of Concern Local Remedial Action Plan Implementation Structure

The overall strategy for implementation of the St. Clair River Remedial Action Plan (RAP) is to have recommended actions carried out directly by agencies, facilities, other organizations involved in development of the RAP and/or committed to specific actions, and the general public. To do this, coordinating and accountability bodies have been established.

Two working committees have been set up: (1) a RAP Implementation Committee; and (2) a Public Accountability Committee. The two committees operate independently of each other to ensure accountability. Current members of the Binational Public Advisory Council (BPAC) have the flexibility to join either of the two implementation bodies or their subcommittees, or leave the formal process and work on RAP implementation directly through their own organizations. The RAP participants determined through consensus that the former RAP team would become by default, the RAP Implementation Committee and the BPAC would become the Binational Public Accountability Committee.

1. The RAP Implementation Committee (RIC):

- coordinates implementation activities
- updates problem definitions and restoration of impaired uses
- initiates and responds to monitoring and research results/activities
- undertakes data assessment and makes remedial decisions/recommendations
- tracks progress and schedules relating to remedial actions
- undertakes educational activities
- produces short biennial reports, including update of problems, progress of remedial actions, further recommendations, progress towards goals and objectives
- reviews and tracks agency programs, activities, regulations, and lobby, accordingly
- coordinates activities with all parties responsible for remediation, agencies and other stakeholders
- provides meeting minutes, data, updates, etc. to the accountability committee regularly and upon request

This committee is small (approximately 12 to 15 members). It consists of representatives of all sectors responsible for implementation of the RAP, such as industrial, municipal, Ontario Ministry of the Environment, Ontario Ministry of Natural Resources, and Michigan Department of Environmental Quality representatives. A representative of the Friends of the St. Clair River is on the Implementation Committee to ensure coordination with their educational projects.

The RIC has set up ad hoc working groups, as necessary, to carry out specific functions, for example, to develop a contaminated sediments workplan. Membership on the subcommittees is based on specific interests and expertise and is open to individuals beyond those already sitting on the RIC.

2. The RAP Public Accountability Committee:

- audits the implementation of the RAP
- evaluates progress towards goals, objectives and delisting
- reviews the environmental monitoring results
- provides advice on priorities and directions to the RIC and its subcommittees
- issues an annual report to the public which assesses progress on the RAP

This committee includes representatives from each of the sectors and a representative from the First Nations. The people sitting on the Public Accountability Committee do not sit on the RAP Implementation Committee in order to fulfil the auditing role without a conflict of interest.

Regular meetings of this committee are relatively infrequent. Comments are supplied to the RAP Implementation Committee twice yearly. The RAP Accountability Committee also issues an annual audit directly to the public. Committee members receive the minutes and correspondence relating to the other committees on a regular basis. Special meetings of this committee are called at the discretion of some minimum number of members if any issues of concern arise.

